

A PHONETIC STUDY OF WORD-FINAL PHENOMENA IN NORTHERN EAST CREE

by

© Katharine O'Neill

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Abstract

Northern East Cree has several /+h/ morphemes, which, when suffixed onto a word add meanings such as inanimate plurality or animate obviation. Literature on these /+h/ morphemes captures their historical origins and the grammatical contexts in which they appear. What current literature has yet to describe, however, is the impressionistic accent shift, lengthening, and voice quality of word-final phenomena that accompany /+h/ suffixation on to a word. Deviations from predictable accent placement and uncharacteristically long aspiration are just some of the phenomena noted by both researchers and speakers.

This thesis is an attempt at addressing such impressionistic observations and related statements regarding the /+h/ morpheme. More specifically, I explore the precise phonetic phenomena that occur word-finally when a /+h/ morpheme is suffixed to a word, and the relation of the /+h/ morpheme to shifts in accent placement. The data from this study offer a number of intriguing observations. For example, the results suggest that previous analyses of the /+h/ morphemes' properties are incomplete. I propose that the /+h/ morphemes may have both segmental and prosodic effects on the productions of the words that carry these suffixes. Further, I suggest that a full characterization of this morpheme should involve attention to detail concerning dialectal variation.

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Chapter 1: Introduction

1. Introduction

The work presented in this thesis follows a larger body of research on the phonological system of the Algonquian language Northern East Cree (NE Cree) (e.g., MacKenzie 1980; Dyck, Brittain & MacKenzie 2006; Swain 2008; Dyck, Junker & Logan 2010; Dyck 2012). This research contributes to a larger project, the Chisasibi Child Language Acquisition Project (<http://www.mun.ca/ccclas>) by describing some properties of the adult (target) grammar of NE Cree.

Recent literature on the phonology of NE Cree detailing its metrical properties (e.g. syllable structure, accent system) point to a need to study the properties of /+h/ morphemes (Dyck, Brittain & MacKenzie 2006; Dyck 2012). These morphemes add grammatical meaning to a word such as plurality or obviation, when suffixed onto a word. Literature on /+h/ morphemes describes their historical origins and the grammatical contexts in which they appear. However, this literature fails to describe the impressionistic accent shift, lengthening, and voice quality of word-final phenomena that accompany the suffixation of these morphemes on to a word. Through this thesis I describe the phonetic cues to /+h/ morphemes and relevant implications in the NE Cree phonological system. As we will see, the /+h/ morphemes may have both segmental and prosodic effects on the productions of the words that carry these suffixes.

The thesis is organized as follows. In this chapter I state the specific goals of the current research. In Chapter 2, I begin with a general description of Northern East Cree, including its linguistic affiliation and relevant grammatical structures. In Chapter 3, I

elaborate on the grammatical concept of positions generally referred to as empty nuclei and how it relates to NE Cree. I outline the theoretical framework for data analysis in Chapter 4. I detail the hypotheses, methodology, and data analysis of my study in Chapter 5. I conclude my thesis and provide avenues for future research in Chapter 6.

2. Objectives

My objective is to provide a phonetic analysis of the acoustic correlates of accent shift in NE Cree. In NE Cree, the basic accent pattern, which is phonologically conditioned, is non-final, as illustrated in (1a) (MacKenzie 1980; Dyck 2012). However, accent can shift to the final syllable, as in (1b), under morphological conditions to be described later.

- (1) Accent patterns¹
- a. Non-final: 'chî.mân 'boat'
 - b. Final: chî.'mân 'boats'

The final accent pattern is morphologically conditioned – it marks categories such as the inanimate plural (as in (1b)) and animate obviation (e.g. *panikik* 'pancake' becomes *panikik(+h)* 'pancake (obv.)' in the sentence *John waapimaau panikik(+h)* 'John sees the pancake'). Such finally-accented, morphologically conditioned words are hereafter also referred to as words 'with affix'. According to MacKenzie (p.c., January 2012) citation words with final accent (1b) are produced with heavy word-final aspiration, as exemplified in (2).

¹ All word and gloss examples are provided in orthographic form.

- (2) Word-final accent with heavy aspiration:

*chî. 'mâ.n(+ h) 'boats'*²

However, recent acoustic investigations point out that citation forms with non-final accent (1a) are also produced with final aspiration (e.g. (Dyck 2012), as in (3)).

- (3) Non-final accent with aspirated release of word-final plosive:

'chî.mân[h] 'boat'

These facts point to the need for the present study, in which I compare citations forms with non-final and final accents, examining how accent and accent shift (associated with the / + h/ morpheme) are acoustically realized. The general question which I address in this thesis is whether or not there is a phonetic difference between word-final aspiration on words without a / + h/ affix, and aspiration that manifests as an acoustic realization of the / + h/ affix. More generally, I provide an acoustic analysis of the differences between the acoustic production of accent in non-finally and finally accented words.

3. Significance

The research presented below contributes to our understanding of / + h/ morphemes, which also has implications for historical Algonquian. Further, this study contributes to phonological theory, in particular concerning the notion of the 'empty nucleus'. More specifically, it raises the question concerning what type of phonetic material may be

2 In all orthographic examples, (/ + h/) indicates morphologically conditioned aspiration where as [h] indicates phonemically conditioned aspiration.

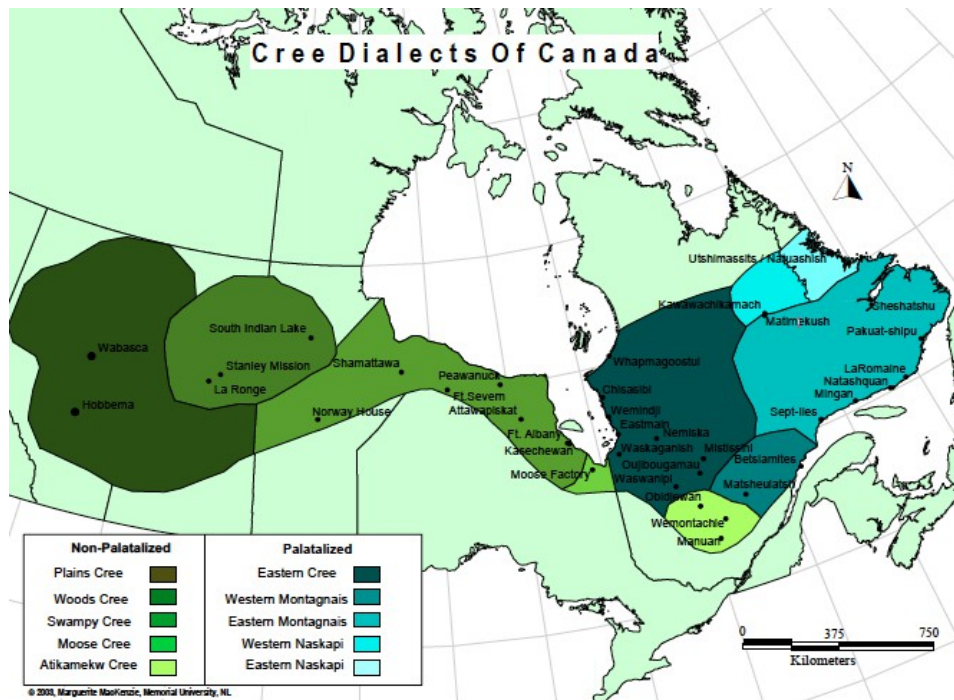
used to fill such empty nuclei. From an empirical standpoint, this research also contributes acoustic data concerning potentially relevant sub-dialectal variation of NE Cree in James Bay communities. Lastly, this research offers a minimal baseline for the study of the acquisition of NE Cree. It presents a first step by describing phonetic and phonological details relevant to the adult (target) grammar, which must be necessarily understood before embarking on a study of the acquisition thereof.

Chapter 2: About NE Cree

1. Linguistic affiliation of NE Cree

NE Cree is part of the Cree-Montagnais(Innu)-Naskapi (CMN) dialect complex, of the Algonquian language family (MacKenzie 1980). This continuum is illustrated on the map in (4) (see www.atlas-ling.ca for more information).

(4) Cree Dialects³ (map adapted from www.atlas-ling.ca)



Typologically, Cree is a morphologically complex, polysynthetic language. It is a non-configurational (Hale 1983), head-marking (Nicholas, 1986) language. That is to say, it is a typological category of language which groups core grammatical properties of

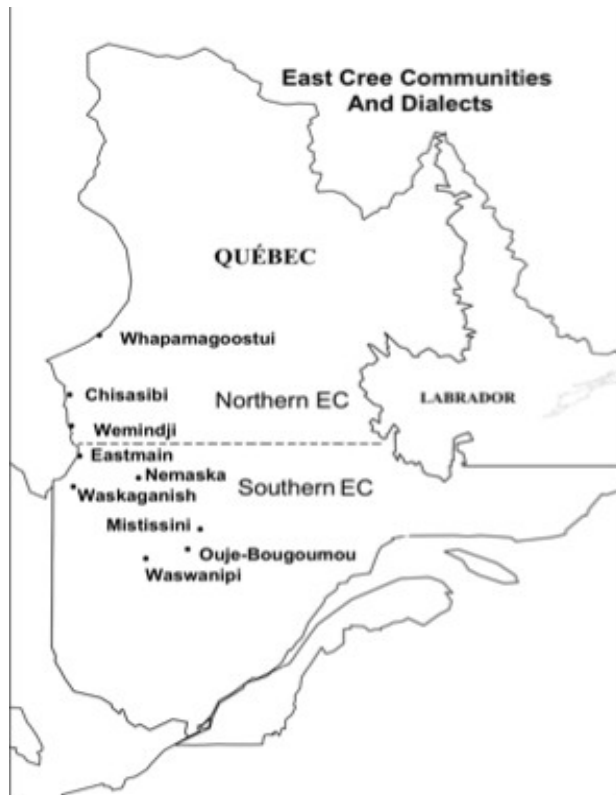
3 Note: the Plains and Central groupings are divided geographically and not linguistically.

predicates and arguments on the verbal structure itself (Evans & Sasse 2002); the verb alone can act as a free standing grammatical utterance. Each verb contains pronominal affixes which are somehow equivalent to syntactic arguments (Jelinek 1984).

The CMN complex divides into Western and Eastern languages. The former do not palatalize Proto-Algonquian (PA) *ki (*k/ also palatalizes in front of other high vowels), while the latter do palatalize PA *ki (MacKenzie 1980) NE Cree is thus a diachronically palatalizing dialect. The image in (5) maps where the two main Eastern Cree dialects, North East Cree and Southern East Cree are spoken (Salt et al., 2004). There is also some dialectal variation in NE Cree, notably between the Coastal and Inland sub-dialects (MacKenzie 1980). The differentiation between Coastal and Inland sub-dialects of NE Cree is, however, not well-documented. Speakers of Coastal NE Cree maintained hunting territories along the coast of James Bay, Quebec, whereas speakers of Inland NE Cree used to travel east for hunting purposes (Marguerite MacKenzie, p.c., March 2012). For more information on the Coastal and Inland sub-dialectal variation, see Dyck, Junker & Logan (2010). In this study, I use recordings of speakers from Chisasibi, Quebec, one of nine Northern East Cree communities in the James Bay area (<http://www.chisasibi.org>). Two speakers speak an Inland sub-dialect, while the third speaks a Coastal dialect.⁴

4 Although no previous research has described any dialectal variation in the current area of study, it is a possibility and I have taken this into account while interpreting the results.. For findings in this area, refer to Chapter 6.

(5) East Cree Dialects (map adapted from Salt et al., 2004)



2. Segmental structure

The consonant inventory of NE Cree consists of three (or four) plosives and three fricatives, which can be phonetically voiced or voiceless (Dyck, Brittain & MacKenzie 2006). The inventory is listed below in (6).

(6) Consonants⁵ (Dyck, Brittain & MacKenzie 2006)

p	t	ch [tʃ]	k, k ^w
	s	sh [ʃ]	h
m	n		
w	y [j]		

The segment /k^w/ can be analyzed as a single segment or as a complex segment consisting of /k + ^w/. Neither analysis has any bearing on syllable weight (Dyck, Brittain & MacKenzie 2006).

Vowels in NE Cree are historically categorized as either 'long' or 'short'. At present, however, vowels are phonetically distinguished between tense (formerly long) and lax (formerly short) (MacKenzie 1980). The historical vowel length still plays a role in determining both pitch accent location and morphophonemic processes (see also §4) (Dyck 2012). For example, the process of Initial Change, which affects the first syllable of a verb or preverb, causes short /a/ to become long (/â/), and /â/ to become [iyâ] (MacKenzie 1980; Brittain & Dyck 2006). As an example of initial change, *nîpû* 's/he is standing' becomes *nâpuwî* when used as a question (www.eastcree.org). A full vowel inventory is provided below in (7) (Dyck 2012). In this paper, I use the ^ː diacritic to indicate a long vowel.

5 All segments in (6) and (7) are listed in their orthographic form. Where orthographic form and phonetic form differ, the phonetic form is provided in square brackets.

(7) Vowels (Dyck, Brittain & MacKenzie 2006)

Long		Short	
î [i(:)]	û [u(:)]	ï [ɪ, ɨ, ə]	u [ʊ]
â [a(:)]		a [ɪ, ɛ, ɨ, ə, ʌ]	

Diphthongs in NE Cree pattern with long vowels. The diphthongs are listed in (8).

(8) Diphthongs (Dyck, Brittain & MacKenzie 2006)

âw [ɑw], aw [aw], wâw [ʷɔʷ, ɔʷ, ʷɔʷ, ɔʷ], wâ [wa], îw [iw], iw [ɪw], u:, o:, uy [uy], wî [wi], wîw [wiw]

3. Syllable structure

Maximally, syllables in NE Cree consist of an onset consonant (C), a nucleus (V), a coda (C), forming a (C)V(C) template (Dyck 2012), as illustrated below in (9).

(9) Syllable template (Dyck, Brittain & MacKenzie 2006)

#	C _{onset}	V	C _{coda}	#
	Any consonant in (6)	Any vowel in (7)	[h, s, ʃ]	

Coda consonants can only be fricative, and are limited to the consonants [h, s, ʃ] (MacKenzie 1980; Dyck, Brittain & MacKenzie 2006). Since words consist of syllables, and syllables can end with a coda, the template in (9) predicts that only a single consonant, either [h, s, ʃ], should occur word-finally in NE Cree. However, words such as *miht* [miht^h] 'firewood (sg.)', which end in an impermissible coda segment, are typical. To account for this possibility, I assume the existence of an 'appendix' position

for 'extra' word-final consonants. I will discuss this position more fully in §5. The full NE Cree word syllable template is presented in (10).

(10) Word template with appendix (Dyck 2012)

#	σ^n	'Appendix' (C_{onset})	#
	Any number of syllables as in (9)	Any consonant in (6)	

The 'appendix' is onset-like in that it can contain any of the consonants that can occur in onset position. A word like *miht*, then, is syllabified as in (11).

(11) Syllable template for *miht* 'firewood'

#	C_{onset}	V	C_{coda}	'Appendix' (C_{onset})	#
	m	i	h	t	

4. Accent

Each word in Cree contains one salient (prominent) syllable, which is referred to as the accented syllable.⁶ The accented syllable in each word (denoted with ['] at the beginning of the syllable), correlates phonetically with higher pitch and intensity (Martin 1974; MacKenzie 1980; Brittain 2000; Dyck, Brittain & MacKenzie 2006; Dyck 2012). I discuss the acoustic correlates of accent below in §4.1. The placement of pitch accent in NE Cree follows one of two patterns. The basic pattern, described in §4.2, where the accent is non-final, and the final accent pattern, described in §4.3, where the accent is always final (MacKenzie 1980).

6 In the literature, the salient syllable is also referred to as stressed, accented, or pitch-accented.

4.1. Acoustic correlates of accent

Acoustically, accented syllables receive prominence through a rise in pitch level and a higher intensity cross-linguistically. The acoustic properties of accentuation in NE Cree have been studied in particular by Swain (2008). Swain argues that in both child and adult productions of NE Cree, pitch is used as the primary cue to stress- referred to as “accent” in this study – in a word. Additionally, Swain finds that intensity also functions as a cue to mark stress, but to a lesser degree than pitch. Swain attributes the use of the two cues to the physiological relationship between pitch and intensity, following Ladefoged (2005), who notes that pitch can be achieved through the application of greater force in the respiratory muscles, which also results in higher intensity.

4.2. Basic accent pattern

In the non-final accent pattern, words are accented on either the penultimate syllable or the antepenultimate syllable. When the penult is long, accent falls on it. When the antepenultimate vowel is long and the penultimate vowel is short, accent falls on the long antepenultimate syllable. When both antepenultimate and penultimate vowels are short, the accent can fall on either syllable (MacKenzie 1980). In the example in (12) below, the accent falls on the long, antepenultimate syllable.

(12) Basic accent pattern:⁷

'kâ.ni.chî[h] 'sweater'

4.3. Final accent pattern

The final accent pattern occurs with the addition of one of two homophonous suffixes, both represented phonologically as /+h/, which, as mentioned above, encode either inanimate plural or animate obviative. The final accent pattern is thus morphologically conditioned. With the addition of the /+h/ suffixes, the accent shifts to the final syllable, as shown in (13).

(13) Final accent pattern:

kâ.ni. 'chî(+h) 'sweater (pl.)'

For an explanation of the concepts of animacy and obviation, refer to the appendices I and II.

5. Metrical Properties of NE Cree and Extrametricality

In this section, I turn to the metrical properties of NE Cree. Recall that the two accent patterns in NE Cree yield two different word-final behaviours. The word-final accent pattern, accompanied by the /+h/ affix and word-final aspiration, displays a shift in accent from the non-final to the final syllable. When the /+h/ affix is not present, word-final aspiration does not compel accent to shift to the final syllable. The property of extrametricality (Lieberman & Prince 1977; Hayes 1981; Harris 1994) accounts for the

⁷ Again, in all orthographic examples, (/+h/) indicates morphologically conditioned aspiration where as [h] indicates phonemically conditioned aspiration.

difference between the non-final and the final accent pattern (Dyck 2012). As shown in (14a), in the non-final accent pattern, the final syllable is extrametrical (as indicated by angle brackets < >) and therefore ignored for accent purposes. In contrast, as shown in (14b), the final vowel is 'visible' for accent purposes in the final accent pattern. This analysis assumes that / + h/ is a type of syllable nucleus, relevant for accentuation, as described on page 16.

(14) Extrametricality

- a. Non-final accent: *'chî. <mân[h]>* 'sweater'
- b. Final accent: *chî. 'mân <(+ h)>* 'sweater(pl.)'

Dyck, Brittain & MacKenzie (2006) describe NE Cree accent placement as follows, where H is 'heavy' and L is 'light'.

(15) Metrical parameters of NE Cree (Dyck, Brittain & MacKenzie 2006)

- a. The final syllable is extrametrical, unless extrametricality would render the whole word unaccentable. Abstract final endings/syllables create the appearance of final accent.
- b. Northern East Cree is quantity-sensitive at the level of the nucleus. A heavy (H) syllable (i.e., a syllable with a branching nucleus or rime) contains a historically long vowel or a rising diphthong. A light (L) syllable (i.e., a syllable with a short vowel) contains a historically short vowel.
- c. There is no Weight-By-Position (i.e., a coda does not add weight to a syllable, or is 'non moraic').
- d. Feet are iambic (i.e., feet are formed by weak syllable followed by a strong syllable); footing is from the right edge of the word.
- e. There are no degenerate (L) feet (i.e., there are no feet that consist of a single light syllable. A single (L) penultimate foot can occur. Degenerate feet are obligatory in words containing a L syllable followed by a final abstract ending.
- f. End Rule Right: the rightmost metrical prominence is accented.

Property (15a) states what is illustrated in (14). If a word consists of only one syllable, that syllable cannot be extrametrical, as it would render the word unaccentable. The example in (16) illustrates a one-syllable word with no extrametricality.

(16) One-syllable word:

pîn 'wooden clothespin'

The parameters stated in (15b) and (15c) describe that long vowels attract accent. In the non-final accent pattern (refer to §4.2), if the antepenultimate is long and penultimate is short, the accent falls on the long syllable. A coda consonant, however, has no effect on

syllable weight. Examples are provided in (21) below as well as throughout the remainder of the thesis.

5.1. Accent and word-final phenomena

As discussed in §4, words with and without accent shift display similar word-final phenomena. I describe these phenomena more fully below.

In words in isolation with non-final accent, word-final stops /p, t, k, k^w/ and nasals /m, n/ are released with aspiration. This aspiration is purely phonetic and does not impact accent placement. In (17), in the non-final accent word, the final /n/ is released with aspiration.

(17) Non-final accent word aspiration:

wâ.pu.yân[h] 'blanket'

Words with final accent are also released with aspiration following word-final stops and nasals. The aspiration is associated with accent shift from the non-final to the final syllable. In the example (18) below, the final /n/ is aspirated, indicating plurality. The accent shifts to the final syllable in this case.

(18) Final accent word aspiration:

wâ.pu.yân(+ h) 'blanket (pl.)'

Anecdotally, Dyck (p.c., September 2011) observed other word-final phenomena, which need to be systematically documented, such as the lengthening of word-final fricatives

and affricates; e.g, [ss, ʃʃ, tʃʃ]. For example, *wî.yâs(h)* ['wi:.ya:s] 'meat' impressionistically becomes *wî.yâs(+h)* ['wi:.ya:ss] 'meat(pl.)' when the accent is shifted to the final syllable. Also, word-final vowels in the non-final pattern tend to end with creaky voicing, as in *aschî* ['is.tsi] 'earth'. In contrast, word-final vowels in the final accent pattern are generally followed by a noticeable degree of heavy aspiration, as in *kânichîh* [kan:'tʃi[h]] 'sweater(pl.)'.

The presence of such word-final phenomena can be accounted for by assuming the existence of a special type of word-final syllable, one where the syllable nucleus V (the head of the syllable) contains something other than a vowel (Dyck 2012). (The V denotes a nucleus position). I will refer to this as an 'empty nucleus', even though it has some phonetic content. The phonetic content that fills such empty nuclei positions is not vocalic in nature. This phenomenon has been observed in other languages. For example, researchers have claimed that non-vocalic nuclei are also present in English words such as 'fatigue', where the first vowel is apparently deleted, and acoustic studies show that the word-initial /f/ is lengthened to fill the nucleus position (Davidson 2006).⁸ In NE Cree, as shown in (19) and (20), the final V nucleus in words with non-final and final accents is realized with aspiration or lengthening. The difference between the words with final and non-final accents is that the V nucleus in (19) is not a suffix, whereas the V nucleus in (20) is a suffix (corresponding to the PA */-a/ in other dialects). (See Chapter 3 for discussion of why the affix is a word-final V nucleus in (19)).

8 See Béland et al. (2009) for more examples on non-vocalic nuclei.

(19) Basic accent pattern: *chîmân* 'boat'

#	C _{onset}	V	C _{onset}	V	C _{coda}	V	#
	tʃ	î	m	â	n	h	

(20) Final accent pattern: *chîmân(+h)* 'boats'

#	C _{onset}	V	C _{onset}	V	C _{coda}	+ V	#
	tʃ	î	m	â	n	h	

Other examples of accent shift are provided in (21).

(21) Examples of accent shift by syllable structure (Dyck, Brittain & MacKenzie 2006)

<i>'chî.mân</i>	boat	<i>chî. 'mâ.n[h]</i>	boats
<i>'wî.yâs</i>	meat	<i>wî. 'yâ.s(+h)</i> [wi. 'yæ.ss]	meat (pls.)
<i>'wâ.tikw</i>	hole, den	<i>wâ. 'ti.kw(+h)</i>	holes, dens
<i>'mis.chi.shin</i>	shoe	<i>mis.chi. 'shi.n(+h)</i>	shoes
<i>'nuh.kum</i>	my grand-mother	<i>ûh. 'kum(+h)</i>	someone's grand-mother (obv.)

These observations about word-final phenomena are based on impressionistic transcriptions and, as such, call for an acoustic study. For example, an acoustic analysis of these forms may reveal whether word-final aspiration is quantitatively or qualitatively different in words with final versus non-final accent. The current research is designed to address this and related questions. In the next chapter, I describe the concept of empty nuclei and present evidence for their existence.

Chapter 3: Empty Nuclei

In this chapter, I further describe the notion of empty nuclei. I provide evidence for empty nuclei from cross-linguistic data, in §1 and from child language acquisition data, in §2.

1. Cross-linguistic evidence

Languages in which word-final consonants are onset-like typically ban certain segments or features in word-medial codas, but yet allow these same features at the right edge of a word. Empty nuclei have been proposed as a structural position to license such right-edge (or 'extra-prosodic') consonants that have onset-like properties (e.g., Giegerich 1985; Itô 1986; Kaye 1990; McCarthy & Prince 1990; Charette 1991; Piggott 1991; Rice 1992; Piggott 1999b; Rose 2003).

Three types of evidence support the claim that word-final consonants should be analyzed as onsets: the distributional properties of the consonants allowed in word-final position, the shape of the syllable rhyme, and the phonetic properties of the segments in question (Goad & Brannen 2003).

First, in languages where word-final consonants are onset-like, the final consonant can consist of any segment of the segmental inventory allowed in the onset position, as in NE Cree (see examples (9) to (11)). In contrast, in languages where the word-final consonants are coda-like, the first consonant of a word-final cluster – or alternatively, the sole consonant allowed word-finally – can only consist of the kinds of consonants allowed in codas. For example, in Diola Fogy (Sapir 1965; Piggott 1999b;

Rose 2003) only liquids and nasals which are homorganic with the following onset (i.e., [salte] 'be dirty') are permitted in word-medial codas. Word-finally, however, consonants of any place feature and consonant clusters with differing place features are permitted (i.e., [nikəkɔb] 'I waited').

Second, if the word-final consonant is an onset, the rhyme can be CVXC word-finally, yet only CV(X) word-medially (where X refers to either a V or a C; CVXC, for example, indicates both CVCC and CVVC). For example, in French (Charette 1991; Dell 1995), the only syllable structure permitted word-medially is CVC, yet the structure CVXC is permitted word-finally. As another example, in NE Cree only CV(V)C is permitted word-medially, yet CV(V)CC is permitted word-finally, as in examples (9) to (11) (Dyck 2012).

Finally, if a word-final consonant is onset-like, it can display the same release properties as other onsets. In Yapese, an Austronesian language spoken on the island of Yap in the Federal States of Micronesia, for example, word-final onset stops pattern with word-medial onsets and are released with aspiration, whereas word-medial coda stops are left unaspirated (Jensen 1977; Goad & Brannen 2003). However, it is important to note that in languages where this pattering occurs, the release properties of onsets and word-final onset consonants are similar, yet not necessarily identical (Goad & Brannen 2003). This distinction will become relevant when measuring for the difference between non-final and accent-final words in NE Cree.

2. Evidence from child language acquisition

Evidence from child language acquisition also points to the possibility of syllabifying word-final consonants as either onsets or codas (Goad & Brannen 2003; Rose 2003). For example, the two children described in Rose (2003), Clara and Théo, demonstrate both possibilities in their acquisition of Québec French. While both children showed a generally similar path of development, their behaviours relative to the acquisition of the French rhotic /ʁ/, phonetically a uvular fricative which is often devoiced in word-final position. In Clara's productions, /ʁ/ systematically underwent deletion both in word-medial coda position and word-finally. Théo, on the other hand, deleted /ʁ/ in word-medial codas, but acquired /ʁ/ word-finally.

(22) Clara's word-final and word-medial /ʁ/ (Rose 2003)

Orthography	Target form	Child output	Age	Gloss
dehors	[də'ɔʁ]	[dæ'ɔ:]	2;01.5	'again'
Charlotte	[ʃaʁ'lot]	[sæ'lot]	2;01.05	'book'

(23) Théo's word-final and word-medial /ʁ/ (Rose 2003)

Orthography	Target form	Child output	Age	Gloss
encore	[ɑ̃'kɔʁ]	[ə'kɔʁ]	2;03.20	'again'
fourmi	[fʊʁ'mi]	[fu'mi]	3;05.26	'ant'

In (22), Clara's productions of '*dehors*' and '*Charlotte*' illustrate deletion of /ʁ/ both word-finally and word-medially. Clara later acquires word-medial and word-final /ʁ/ during the same developmental period, independent of the remainder of her consonants

in word-final position. (23) illustrates Théo's deletion of /ʁ/ word-medially in 'fourmi', and production of /ʁ/ word-finally in 'encore'. Théo later acquired word-medial /ʁ/ at the same time as other coda position consonants.

Rose (2003) argues that this difference in the treatment of word-final /ʁ/ rests in how the children represented the place features of their respective rhotics, which in turn had an impact on how the segment was syllabified. Clara's /ʁ/ was represented as phonologically placeless. This lack of place feature yielded Clara to syllabify word-final /ʁ/ as a coda, which caused it to pattern with word-medial codas. In contrast, Théo's representation of /ʁ/ included a Dorsal place feature, which allowed him to syllabify word-final /ʁ/ as an onset, similar to all other consonants, and caused it to pattern unlike word-medial codas (all acquired at a later stage). More generally, this analysis shows that the child's analysis of the consonants, itself based on both acoustic and distributional criteria (Rose 2003), may yield two formal systems at the right edge of words (also, (Piggott 1999b).

2.1. Interim summary

In summary, word-final consonants can be analyzed as either onset-like or coda-like, depending on well-established types of evidence from both adult languages and language development. Based on the distributional criteria presented above, NE Cree has a word-final, onset-like final C position. In the next section, I discuss how a theory of non-linear phonology, Government Phonology (GP), accounts for the presence of word-final onsets with abstract grammatical structures, namely empty nuclei.

Chapter 4: Theoretical Framework

1. Theoretical framework

Government Phonology (GP) is a framework which makes extensive use of the concept of empty nuclei. In this next section, I will briefly elaborate on the GP theories of syllable structure applicable to the current discussion. In particular, GP claims that onset-like word-final consonants are onsets of special syllables containing empty nuclei (Kaye, Lowenstamm & Vergnaud 1990; Piggott 1999b). Relevant principles of GP are outlined in §2 and discussed in relation to NE Cree in §3.

2. GP and prosodic licensing

Classical GP holds that all word-final consonants are onsets of an empty-headed syllable (Kaye, Lowenstamm & Vergnaud 1985; Kaye, Lowenstamm & Vergnaud 1990).

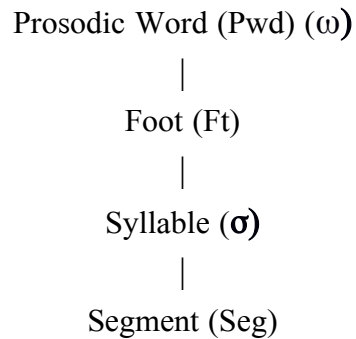
Following GP, the syllable is composed of three constituents: onset, nucleus, and coda. These constituents are maximally binary, and are held together through governing and licensing relationships (described below).

However, more recent versions of GP, including Piggott (1999b) allow for the syllabification of word-final consonants as either codas or onsets. A basic assumption in GP and in other non-linear phonological theories is that for any segment to be realized, it must be 'licensed'. The notion of licensing, in turn, refers to the prosodic hierarchy (Itô 1986; Goldsmith 1990). In brief, segments must be licensed by an element higher in the prosodic structure in order to be produced. The formalized principle of Prosodic (P-) Licensing is in (24) and the hierarchical prosodic structure is in (25).

(24) Prosodic Licensing (PL; (Piggott 1991))

Every (non-terminal) phonological element is in a licensing relation R where $\alpha R \beta$ entails α licenses β and α is superordinate to β

(25) Prosodic Hierarchy (Piggott 1991)



As discussed later, word-final onset-like consonants in NE Cree are licensed as onsets of special word-final syllables that contain empty nuclei.

3. GP and licensing in NE Cree

The location of empty nuclei is constrained in GP. In this section, I describe only the constraints relevant to licensing right-edge empty nuclei. Such nuclei are Edge Licensed. The Edge Licensing constraint allows for the licensing of empty nuclei by their virtue of being at a word boundary. A formalized principle of Edge Licensing is in (26), where languages either adhere (YES) or do not adhere (NO) to the licensing constraint.⁹

⁹ Piggott (1999b) characterizes Edge Licensing as a type of Remote (R) Licensing. While the word-final consonant is licensed by virtue of being at the word edge, Piggott (1999b) argues its licensor is an element somewhere higher (remote) in the prosodic structure.

Languages which do adhere syllabify word-final consonants as onsets. Languages which do not syllabify word-final consonants as codas.

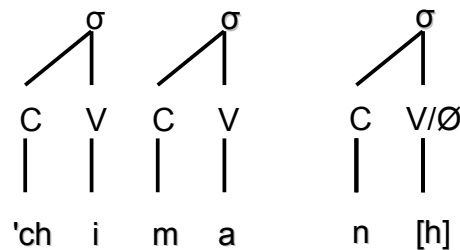
(26) Edge Licensing (Piggott 1999b)

Final consonants are R-licensed: YES (unmarked)/NO

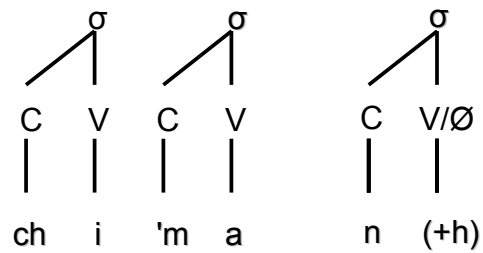
For an example of Edge Licensing in NE Cree, refer to the pair of words *'chîmân[h]* and *chî'mân(+h)* in illustration (27). In both words, the final empty nucleus is Edge Licenced by virtue of being at the word edge, #. The difference between (27a) and (27b) is that the final empty-headed syllable is only metrically relevant in (27b), whereas in (27a) the final syllable is not visible for accent purposes. It is not clear how the prosodic structure shown in (27) relates to higher prosodic structures (e.g., the Pwd). However, this issue is not relevant to the present study, which focuses on the phonetic realization of the final empty-headed syllables in (27), and not on the remainder of the abstract structure of the Pwd.

(27) Syllable structure

a. *'chî.mân[h]* 'boat'



b. *chî. 'mâ.n(+h)* 'boat (pl.)'



4. Interim summary

As discussed in Chapter 2, the empty-headed syllables shown in (27) are not, strictly speaking, empty. Their nuclei are filled phonetically with aspiration, among other things, such as fricative lengthening (see also Chapter 2 §5.1). GP provides a theoretical explanation for the presence of word-final phenomena in both of the types of words shown in (27). However, it does not shed light on the difference between the two types of words in NE Cree (non-final vs. final accent). The study below aims to elucidate whether these two types of words are phonetically distinct in terms of word-final phenomena.

Chapter 5: The Study

1. Introduction

In this chapter I detail the quantitative and qualitative research undertaken as a portion of this thesis. As discussed in Chapter 4, Government Phonology offers a way to formally distinguish between the two units, the /+h/ morphemes and word-final phonetic aspiration. I use this distinction as a basis for the formulation of empirically testable hypotheses, which I define below in §2. In §3, I discuss the data I used in this study, including the source of the data and how it was collected. Finally, in §4, I outline how I analyzed the data, both quantitatively and qualitatively. I discuss the results of the data analyses in the following chapter, Chapter 6.

2. Hypothesis

As illustrated in Chapter 4, analyzing the NE Cree syllable structure in a nonlinear phonology framework renders it necessary to posit abstract structures. For example, in the syllable structure in (27a) the final empty-headed syllable is not metrically relevant, since it is not associated with accent shift. However, the final empty-headed syllable in (27b) is metrically relevant, as its presence does compel accent shift.

It is necessary to ask whether, and how, structures postulated in theoretical phonology are reflected concretely in phonetic productions. The general working hypothesis assumed for this research project is that these abstract structures should be reflected concretely. The hypothesis will be tested through an investigation of research questions (RQs) 1 and 2.

(28) Research Question 1:

Does the suffixation of the metrically relevant / + h/ morpheme prompt a difference in pronunciation?

(29) Research question 2:

How does accent or accent shift relate to RQ1?

I will address RQ1 through phonetic measurements of word-final phenomena occurring after word-final Cs and Vs in citation forms. Accent, as a phonological phenomenon, is measurable through its phonetic manifestations. I will address RQ2 through an acoustic analysis of the phonetic manifestations of pitch patterns in the non-final and final-accent patterns. My methodology is detailed in the following sections.

3. The data

3.1. Data collection

3.1.1. Speakers

Data for this project comes from the speech of three speakers from Chisasibi, Quebec.

The three speakers, Luci Bobbish-Salt (LBS), Mimie Neacappo (MN), and Jimmy Neacappo (LN), were selected through a referral technique. All are native speakers of NE Cree and also native speakers of English. LBS speaks the Coastal sub-dialect of NE Cree. MN and JN are both native to Chisasibi and speak the Inland sub-dialect. Beyond sub-dialectal differences, the speakers also differ in age. LBS and JN are of the same

generation, whereas MN is one generation younger. Refer to (30) below for a breakdown of speaker dialectal and generational variation.

(30) Speaker profiles

	Coastal NE Cree	Inland NE Cree
Younger generation		MN (female)
Older generation	LBS (female)	JN (male)

While there is little literature on the sub-dialectal and generational variation within NE Cree, this study's findings serve as a starting point for future research. More specifically, where all three speakers do not pattern alike, both generational, sub-dialectal, or simply speaker variation might play a role. As we will see, there are instances in which the data from each of the three speakers do not pattern alike. Where MN patterns with JN, and unlike LBS, this difference might reflect a sub-dialectal variation. Where JN and LBS pattern unlike MN might indicate a generational variation; this also presents an interesting research opportunity regarding language change in NE Cree. I will discuss such instances in Chapter 6.

3.1.2. Tokens

I used a randomized list of word pairs that contrast for final and non-final accent. (The word list was created by Drs. Marguerite MacKenzie, Julie Brittain, and Carrie Dyck). An example contrasting word pair is: '*chî.mân[h]*' 'boat' and *chî.mâ.n(+h)* 'boat (pl.)'. The original list contains 215 items, although speakers omitted or altered certain words

if they were not in their vocabulary, or if speakers used a different word other than the one provided for a given translation. Refer to the appendices (1), (2), and (3) for the complete list.

The tokens were collected through a translation elicitation technique. A trained linguist, (S. Johansson) who does not speak NE Cree, prompted LBS for words orally by being given the English translation. She recorded each word twice. Then, MN, a linguistics MA student and speaker of NE Cree, provided JN with the English translation for each word orthographically, and he read each word once into a recording device. MN also recorded herself citing the words in Cree while reading the English translations. MN provided two tokens for each word.¹⁰ Besides being asked to say each word in isolation, separated by pauses, the speakers were not directed to say the words in any particular manner. As well, the rate of speech was not controlled for. All recordings, impressionistically, have minimal to no background noise, resulting in good acoustic quality for speech analysis. The types of tokens in the word list are provided in (31) for LBS, MN, and JN. For a complete list of the tokens read by each speaker, please refer to (1), (2) and (3) in appendix III.

10 Since the speakers were prompted through English translations, there is a possibility that in some cases the speakers ignored or misheard the English morphology (i.e., the word-final plural marker '-s'), subsequently affecting the NE Cree translation. However, this is unlikely in the case of LBS and MN as both speakers have previous experience in word list citations.

(31) LBS Number and type of token

Final Segment	LBS With/without / + h/	JN With/without / + h/	MN With/without / + h/
Affricates total	9/8	3/3	6/4
/tʃ/	9/8	3/3	6/4
Plosives total	75/60	27/25	63/56
/p/	22/18	5/3	17/15
/t/	23/19	9/11	18/21
/k/	10/0	5/0	10/0
/kʷ/	20/23	8/10	18/20
Continuants total	30/37	16/22	26/30
/s/	14/23	5/9	10/14
/ʃ/	16/14	7/7	16/16
/f/	0/0	4/6	
Nasals total	37/41	16/17	34/38
/n/	18/21	8/8	16/18
/m/	19/20	8/9	18/20
Vowels total	45/45	21/22	40/36
/âw/	11/11	4/5	10/6
/ɪw/	8/11	4/5	6/8
/î/	18/18	11/11	18/20
/û/	8/5	2/1	6/2
TOTAL	196/191	83/89	169/164

3.1.3 Data measurement

I organized and categorized the recordings into three groups according to final phoneme type and sub-type: plosives and affricates; fricatives; and sonorants (vowels and nasals).

I grouped tokens by word-final phoneme type group (i.e., words ending in affricates, plosives, nasals, and vowels) because the particular word-final phenomena (i.e.,

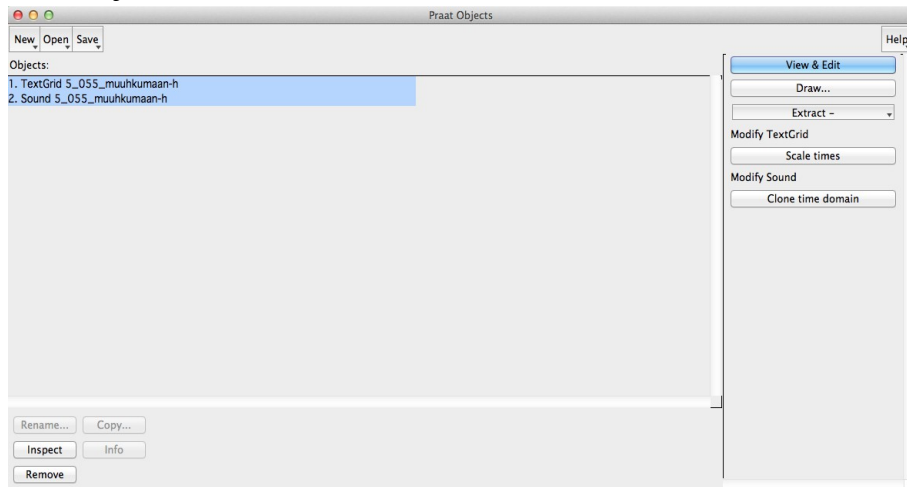
lengthening or aspiration) appeared to depend on phoneme types. That is to say, words ending in fricatives or affricates appear to be lengthened whereas words ending in plosives or vowels appear to have word-final aspiration.

I analyzed all recordings using Praat (Boersma & Weenik 2009), a software program for acoustic analysis.¹¹ I segmented each token using a TextGrid. TextGrids are a type of object used in Praat for the purpose of labelling and segmenting the speech samples. For the purposes of the present project, they are used for setting boundaries around, and labelling, the segments being measured in each token. In order to create a TextGrid for each sound file, I ran a Praat script. The Praat script automatically creates one TextGrid for each sound file (encoded in the wav format). The TextGrid and associated audio files could then be opened as two objects in the Praat Objects window, and were viewed as a combined object in the Praat editor window, as illustrated in (32). Placing a boundary around specific segments in a word assigns that segment a time interval. I was then able to measure a number of acoustic properties of the segment circumscribed by that time interval.

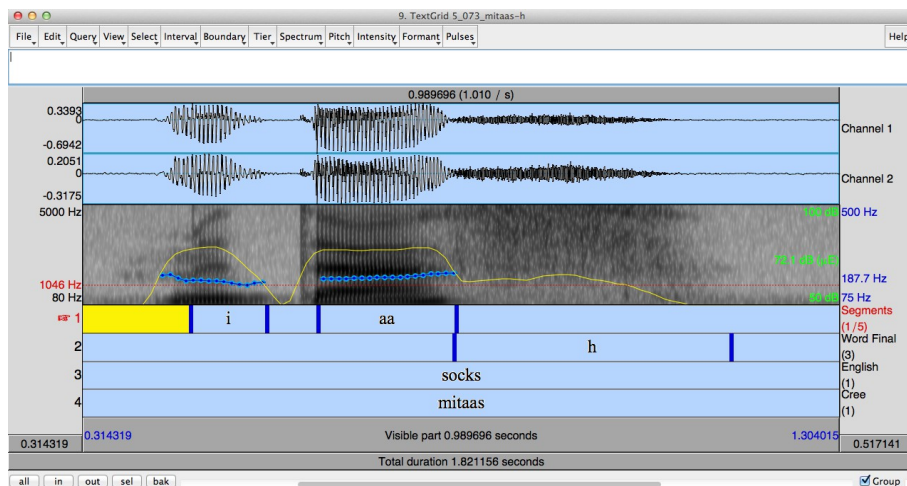
¹¹ For more information on the tools available through Praat, see Owren (2008).

(32) TextGrid and sound file objects in Praat

a. Praat objects window



b. Praat editor window



The TextGrids I created consist of four tiers, labeled for 'Cree', 'English', 'Segments', and 'Word Final'. All tiers are interval tiers, meaning they are delimited by a sequence of labeled boundaries. Referring to the image in (32), the tier names are listed along the right-edge with the Cree word on the bottom tier, underneath the English translation in the 'English' tier. The 'Word Final' tier consists of two boundaries identifying the

beginning and end of the word-final phenomena being measured after each final segment type. In (32) above, I measured the length of the word-final fricative /s/. For the sake of consistency across segments, all word-final phenomena were labeled with 'h', regardless of whether it referred to aspiration or lengthening. The top tier, 'Segments' contained boundaries identifying the beginning and end of the ultimate, penultimate, and (where necessary – i.e., if they were accented) antepenultimate vowels. The particular segment identified by each boundary was labeled within the boundaries. The ultimate, penultimate, and antepenultimate vowels represented orthographically were not always the three vowels identified by the boundaries, due to vowel deletion. The three vowels measured were those acoustically present. For example, in *kânichî* 'sweater', only two vowels are produced, as in [*'ka:ntʃi:*].

Using Praat, I measured each word for (a) word-final phenomena; and (b) pitch and intensity of the last three audible vowels.¹² All measurements served to provide a phonetic description of phenomena associated with accent and accent shift in NE Cree. The measurement of word-final phenomena is described in §3.1.4, and those for pitch and intensity in §3.1.5.

3.1.4. Word-final phenomena

Recall that when an / + h/ morpheme is suffixed on to a word, speakers and researchers note a manifestation of certain word-final phenomena, such as aspiration, segment

12 Short vowels present in the NE Cree orthographic forms are often elided in spoken forms.

lengthening, and voice quality alternation. I explain how I measured each phenomenon phonetically in the sub-sections below.

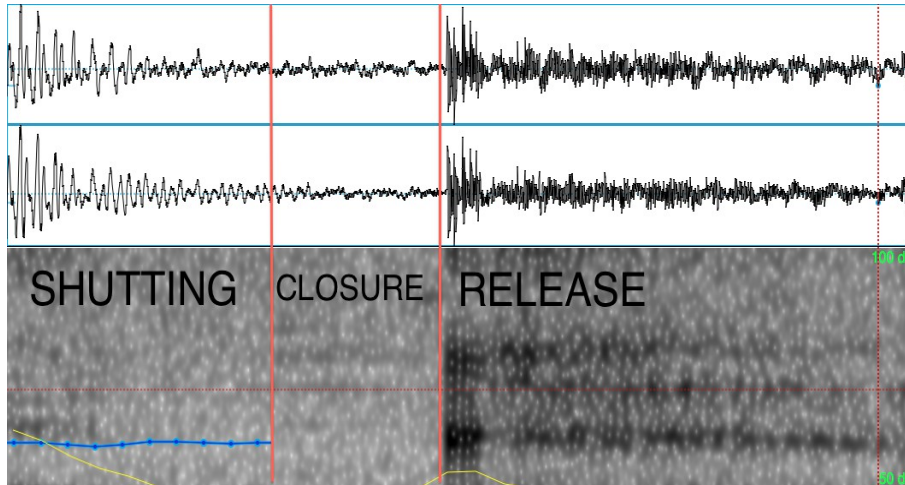
DURATION OF WORD-FINAL PHENOMENA

I measured the length of aspiration after stops.¹³ Acoustic theories of speech production identify three stages in the articulation of stops and affricates: shutting, closure, and release (Lisker & Abramson 1964; Lisker & Abramson 1967; Johnson 2012). The first stage consists of the movement of the articulator to create a stop closure; e.g., the movement of the tip of the tongue towards the alveolar ridge in the articulation of /t/ and /d/. The second stage is the complete closure. The third stage consists of the release of the closure, which is also called the stop burst. These stages are illustrated in (33). Once the closure is released, the vocal folds are held open for a short period of time, allowing a short puff of air to be released. This short puff of air characterizes the 'burst'. When aspiration is present, the vocal folds are held open longer, creating a 'breathy burst' called aspiration. The length of aspiration is measured in milliseconds.

The average frequency of the noise within the frequency range of the fricative /h/, which is relatively low, as compared to other voiceless fricatives. The frequency of /h/ (and other voiceless fricatives) is affected by the constriction of airflow created when air passes through the narrow space between the vocal folds, followed by any other subsequent blocking of the airflow in the oral cavity. In the case of /h/, the only constriction of airflow is at the vocal folds, so the frequency is comparatively low.

¹³ Here, I am referring to the phonetic property of aspiration that occurs when a closure is suddenly released, not pre-aspiration that precedes a voiceless consonant.

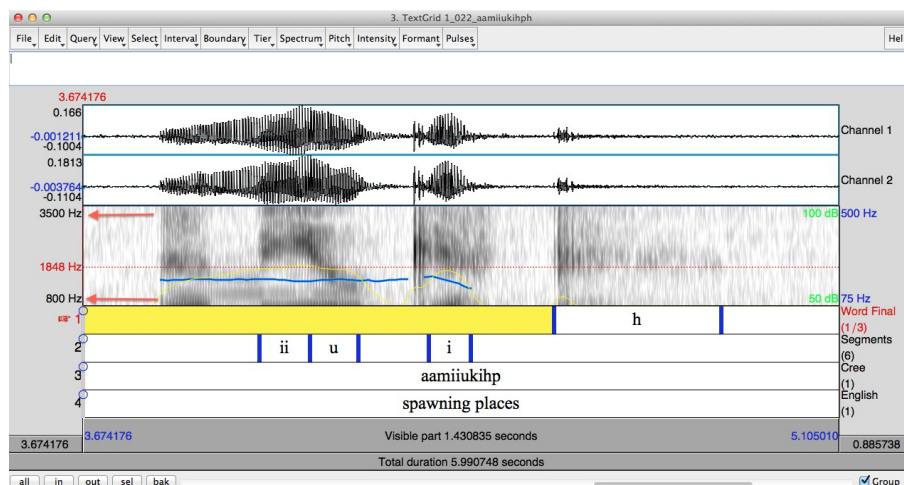
(33) Stages of articulation of stops and affricates¹⁴



In the TextGrid, I measured the aspiration following stops at the onset of the third stage, the burst, as illustrated in (34). I placed the initial boundary at the end of the closure, where the waveform changes from flat to complex and there is a burst of spectral energy. When placing the boundary, I utilized visual cues (waveforms and spectrograms); in particular, I noted where the wave form began flattening and the spectral energy dissipated, in combination with a cessation of perceptible noise. To better assess the dissipation of the energy of aspiration, I identified the approximate frequency of the aspiration (or glottal fricative /h/) and narrowed the spectrogram settings in order to create a more detailed image of the aspiration. For example, the three speakers in this study tend to produce aspiration at a fundamental frequency of around 1800 Hz. Therefore, when measuring aspiration, I narrowed the spectrogram to a range of 800-3500 Hz (refer to arrows on the left in (34)).

¹⁴ This image was created using a NE Cree sound file from this study, based on an image in Johnson (2012).

(34) Measurement of aspiration following stops



After fricatives and affricates, I measured the length of frication. The measurement of length includes the entire fricative duration, as illustrated in (35). I placed the initial boundary where the waveform became aperiodic and where the spectrogram displayed relatively high frequency and spectral energy. Where a fricative follows a stop, the initial boundary was placed directly after the stop burst. Again, I placed the final boundary based on perceptual cues, waveforms, and spectrograms; in particular, I noted where the wave form began flattening and the spectral energy dissipated, in combination with a cessation of perceptible noise.

The low end of the frequency range of the fricative /s/ generally ranges around 5000 Hz, which is higher than aspiration /h/ (Borden, Harris & Raphael 1994; Melnychuk 1999; Johnson 2012). This is due to the high resonance of the wave form created by very turbulent air flow. The airflow of /s/ is more turbulent than /h/ because the airflow is not only constricted at the vocal folds, but the oral cavity has also been narrowed between the tongue tip and alveolar ridge to create another constriction.

Moreover, the teeth act as a passive articulator, obstructing the airflow for a third time.

Therefore, when measuring the length of frication of /s/ for each speaker, I set the

spectrogram range to a higher frequency, between 2000 and 8000 Hz.¹⁵

In contrast to this, the low end of the frequency range of /ʃ/ ranges between that

of /h/ and /s/ (Melnychuk 1999; Johnson 2012). Like /s/, there is a narrow area of

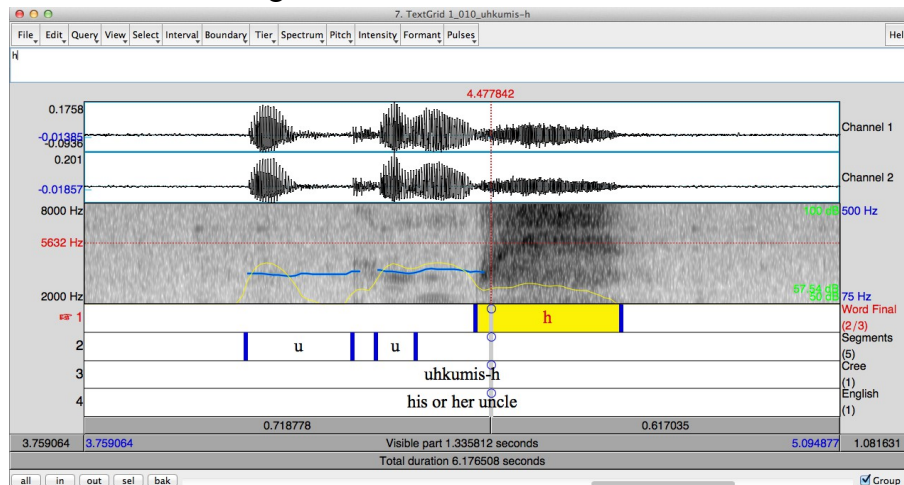
constriction between the tongue blade and the alveopalatal region, however /ʃ/ is also

often produced sublingually, unlike, /s/, which lowers the fundamental frequency of /ʃ/.¹⁶

Therefore, when measuring the length of /ʃ/, I set the spectrogram to a lower range,

between 1000 and 5000 Hz.

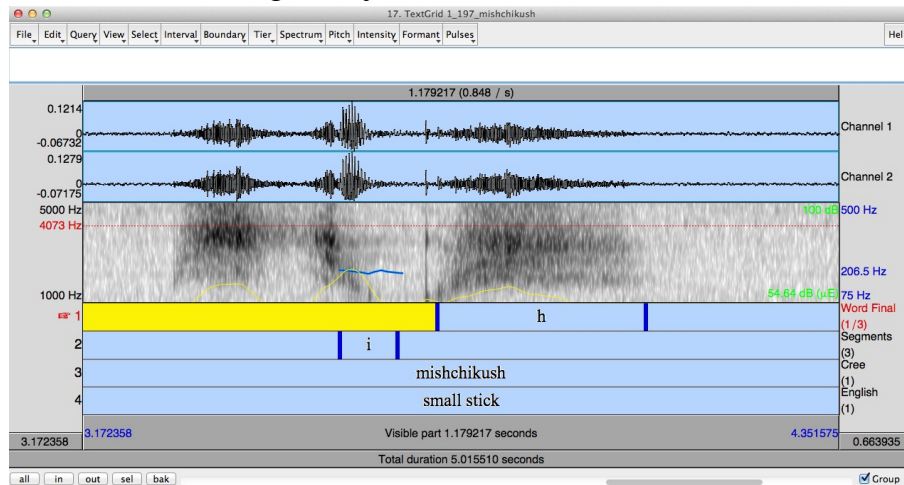
(35) Measurement of length of /s/



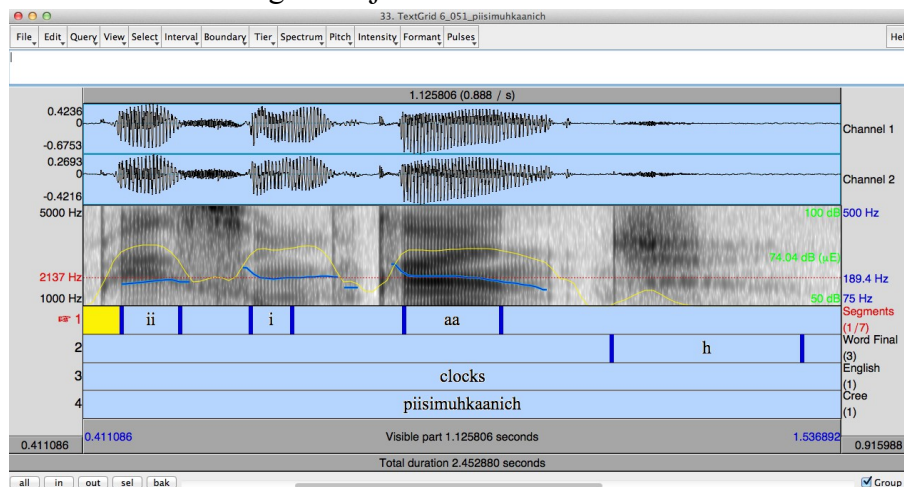
15 My observations on the fundamental frequencies of /s/ and /ʃ/ in NE Cree among LBS, LN, and MN is supported by the findings of a phonetic study of /s/ and /ʃ/ in Eastern Swampy and Moose Cree. See Melnychuk (1999) for more information.

16 Although Johnson's (2012) observation is derived from English language data, its application in NE Cree has been supported by data from the speakers in this study, whose fundamental frequency of /ʃ/ is generally lower than that of /s/.

(36) Measurement of length of /ʃ/



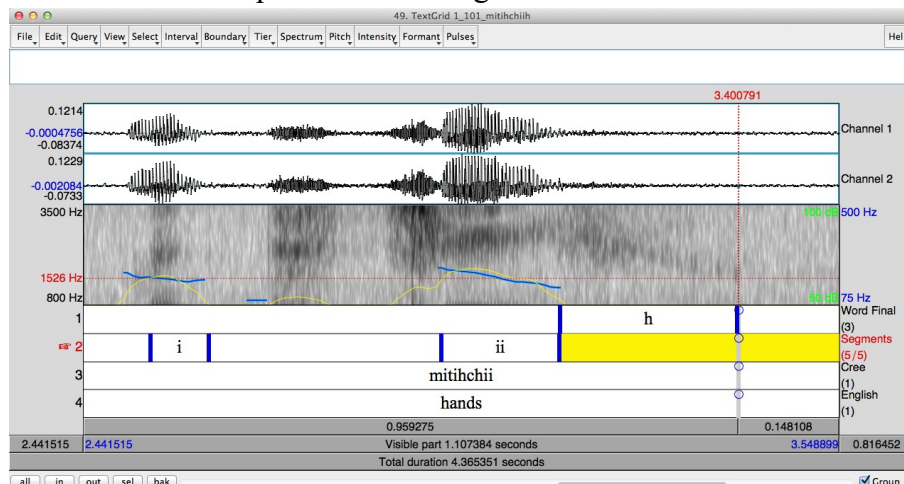
(37) Measurement of length of /tʃ/



I measured the length of aspiration following word-final vowels. The measurement starts after the end of voicing, as illustrated in (38). The initial boundary was placed where the voicing and waveform periodicity ends. (Aperiodicity indicates complete adduction of the vocal folds (Alain 2007)). I placed the final boundary based on perceptual cues,

waveforms, and spectrographic patterns; in particular, I noted where the waveform began flattening and the spectral energy dissipated, in combination with a cessation of perceptible noise. The spectrogram was narrowed to a range of 800-3500 Hz.

(38) Measurement of aspiration following vowels

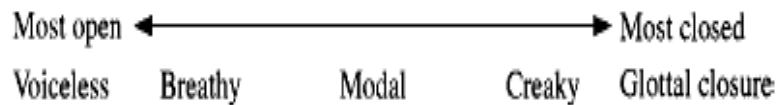


VOICE QUALITIES OF WORD-FINAL PHENOMENA

As mentioned in Chapter 2 §5.1, an alteration in voice quality from creaky to modal voice (and sometimes breathy voice) has been noted impressionistically in association with accent shift (Dyck, p.c., September 2011). However, such voice quality alterations have yet to be systematically documented. In NE Cree, word-final sonorants (vowels and nasals) tend to end in creaky voice in words without the /+h/ affix, and tend to have a modal voice quality in words with the /+h/ affix. Occasionally, the final vowel in words with the /+h/ affix appears to be breathy voiced. However, I did not have the means to measure breathy voicing, and thus left this issue aside for future study.

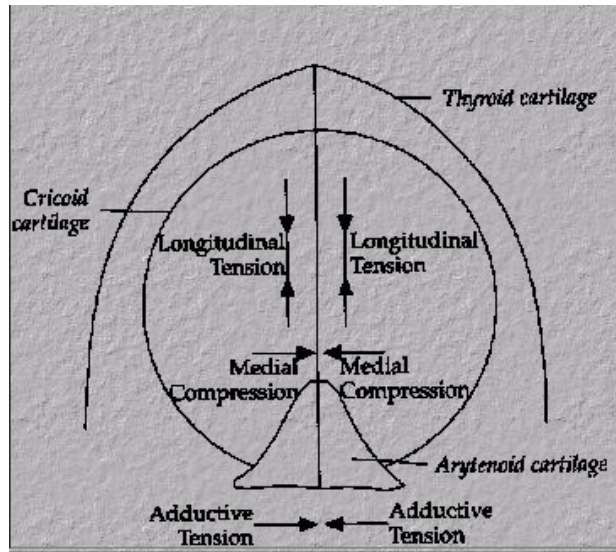
The concept of voice quality is characterized by a continuum of phonation types articulated via the vocal folds in the larynx. The larynx manipulates the vocal folds into controlling the output of air and corresponding acoustic energy, thus creating differing phonation types. Phonation refers to sound produced via the vibration of vocal folds (Kane & Gobl 2013). The distance between the vocal folds, called the glottis, ranges from open to closed, which allows for such a range of phonation types, also referred to as voice types. The image in (39) illustrates where three common phonation types lie on a continuum ranging from an open to closed glottis state.

(39) Continuum of glottal constrictions (Keating & Esposito 2007)



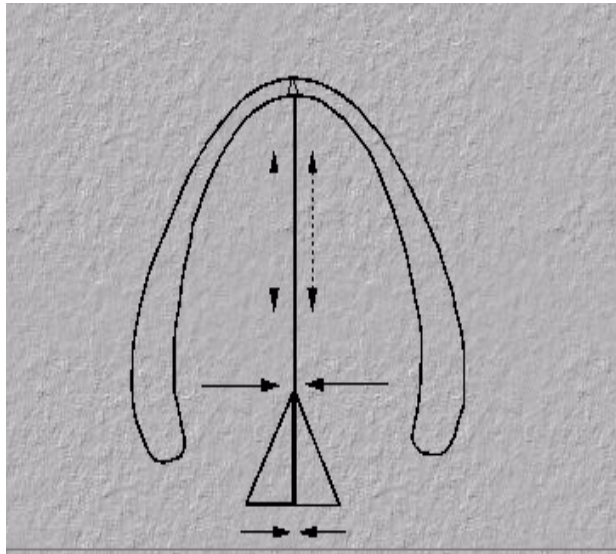
Following the continuum illustrated in (39), modal voice lies in the middle of the continuum with, what is referred to as, a 'default' vocal fold setting (Gordon 2001). As the vocal folds become restricted, the voice quality becomes 'creakier' in quality. Conversely, as the distance between the vocal folds becomes greater, the voice quality becomes more 'breathy'. The constriction and loosening of the vocal folds can be described in terms of the abduction (opening) and adduction (closing) tension forces acting upon them, as illustrated in (40) below (Ni Chasaide & Gobl 1997).

(40) Tension and adjustment forces (Ni Chasaide & Gobl 1997)



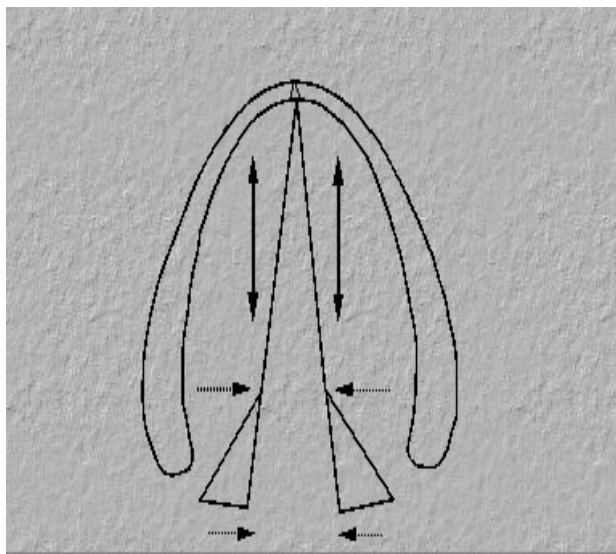
The image in (40) illustrates the tension and adjustment forces acting on the vocal folds to create differing voice qualities. The anatomical forces involved are: the position of the arytenoids, the degree of opening in the intercartilaginous and interligamentary glottis, vocal fold tension, and subglottal pressure (Alain 2007).

(41) Creaky voice phonation (Ni Chasaide & Gobl 1997)



Creaky voice (also called laryngealization, vocal fry, or glottal fry) is produced with strong adductive tension of the vocal cords and weak longitudinal tension. This results in low airflow, creating a low frequency and an irregularly pulsed sound. The pulse sound is created because the adductive tension is so high that only the ligamentary part of the vocal folds can vibrate (Ni Chasaide & Gobl 1997).

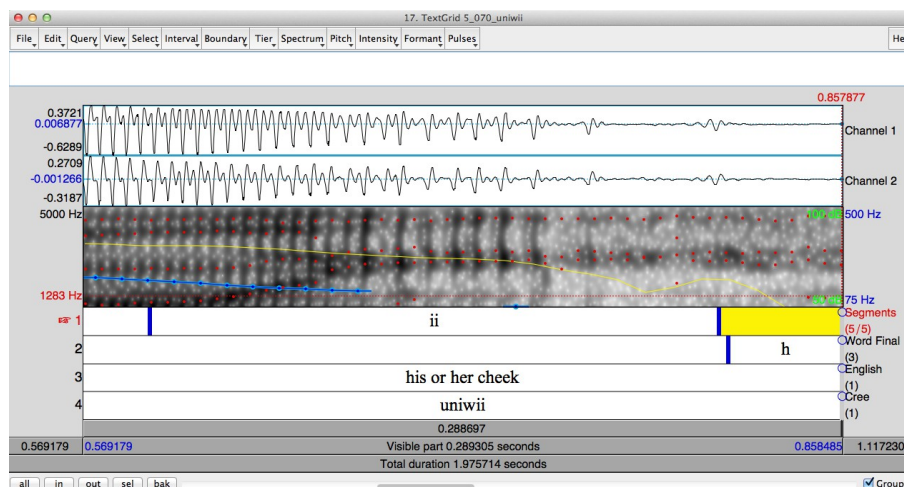
(42) Breathy voice phonation (Ni Chasaide & Gobl 1997)



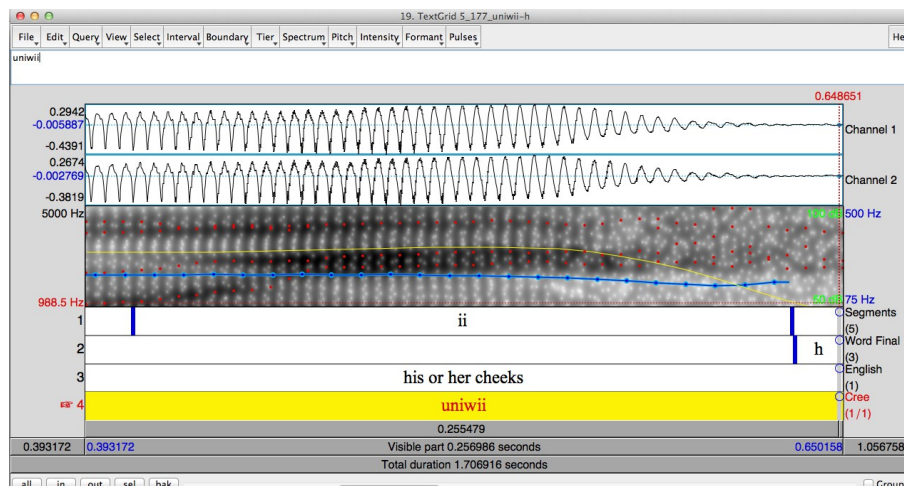
Breathy voice, on the other hand, has a low adductive tension and minimal longitudinal compression, resulting in loose and aperiodic vibration of the vocal folds. Breathy voice is often perceptually fricated, sometimes referred to as 'glottal leakage' due to the weak and incomplete closure of the glottis (Alain 2007). The turbulent airflow is also due to a very high subglottal pressure increasing the exhalatory effort. It is important to distinguish breathy voice from aspiration, which may be done using two characteristics. First, aspiration cannot occur along with voicing, whereas breathy voice is a possible quality of voiced segments. Second, aspiration can only occur at the release phase of a consonant whereas breathy phonation may occur throughout the duration of a segment (Alain 2007).

Modal voice lies between the creaky and breathy voice qualities and is created through mild adductive tension and regular vocal fold vibration (Ni Chasaide & Gobl 1997). An example of creaky voice is provided in (43) and modal voice in (44).

(43) Example of creaky voice



(44) Example of modal voice



Properties of creaky voice are ascertainable through an analysis of the waveform and spectrogram of a given segment in Praat. Creaky voice is characterized by irregular pulses of the waveform and wide spacing of vertical striations on the spectrogram, which indicate low frequency vibrations (Yuasa 2010). To determine the voice quality of each segment, I matched each token with its contrasting token and performed a

comparative analysis to determine where on the continuum of phonation types each segment lies in relation to its contrasting token. For example, I compared the token without affix *uniwî* *['h]* 'his/her cheek' with the counterpart with /+h/ affix *uniwî* (+h) 'his/her cheeks', and determined if the final vowel of each word was creakier or more modal than the other.

The image in (43) illustrates creaky phonation of a word-final /î/ segment in the token *uniwî* 'his/her cheek'. The waveform pulses are the small sections of waves separated by notable flat wavelength portions. On the spectrogram, each waveform pulse is accompanied by a darker vertical striation. The flat wavelength portions between each waveform pulse is accompanied by a light vertical striation indicating a complete cessation of acoustic energy. Contrast this with the image in (44), which illustrates a modal phonation type on the word-final /î/ segment in the token *uniwî* 'his/her cheeks'. A comparison of (44) with (43) illustrates much less pulsing or spectrographic striations in the modal voiced segment. It is the spacing of the vertical striations that represents creakiness. In (43), the waveform maintains the same pattern throughout the segment and has no pulsed waveforms. The vertical striations are not spaced intermittently on the spectrogram.

3.1.5. Pitch and intensity

Recall that one goal of this study is to measure an impressionistic shift in accent from the non-final to the final syllable when a /+h/ morpheme is suffixed onto a word. Accent, as a phonological phenomenon, is measurable through its phonetic

manifestations. As we saw in Chapter 2 §4.1, an accented syllable in NE Cree is produced with a rise in pitch and an increase in intensity.¹⁷ Therefore, to measure where the accent of a token is produced, I measured average the pitch and intensity of the non-final and final syllables in each token. It should be noted that peak pitch would be a more reliable indicator, due to the “rising” nature of accent on a single vowel in NE Cree.¹⁸ That is to say, the rise in pitch rather than overall average pitch characterizes pitch accent in NE Cree. As the recordings for this study took place in a variety of uncontrolled – albeit as quiet as possible – environments, I decided to measure average pitch rather than peak pitch. This goes to show that any significant results are indeed conservative, yet a more controlled study with higher quality acoustic data would serve more precise measurements of peak pitch.¹⁹ I measured the average pitch and intensity of the audible antepenultimate, penultimate, and final vowels by selecting the voiced duration, as illustrated in (45) and (46).²⁰

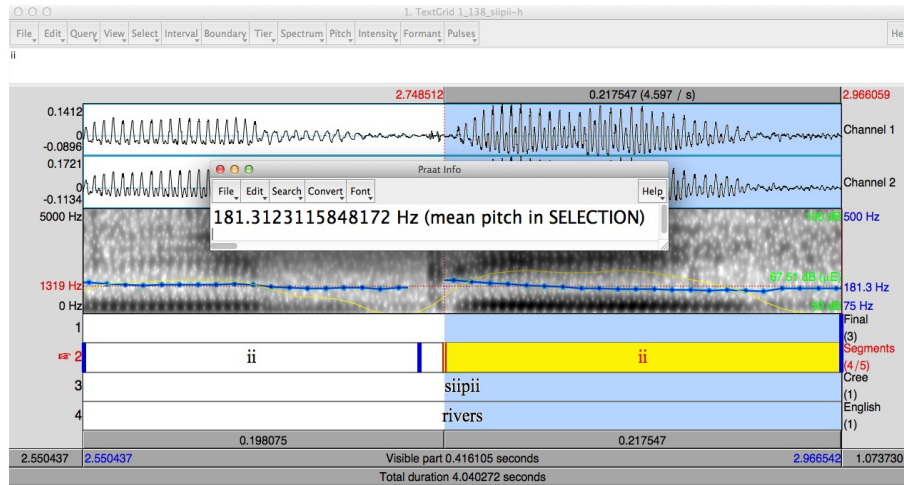
17 Following Swain (2008) who found pitch to be a stronger correlate to stress than intensity, in this study I determined the location of accent based on the highest pitch rather than intensity.

18 Many thanks for Dr. Kevin Russell for bringing my attention to this important detail.

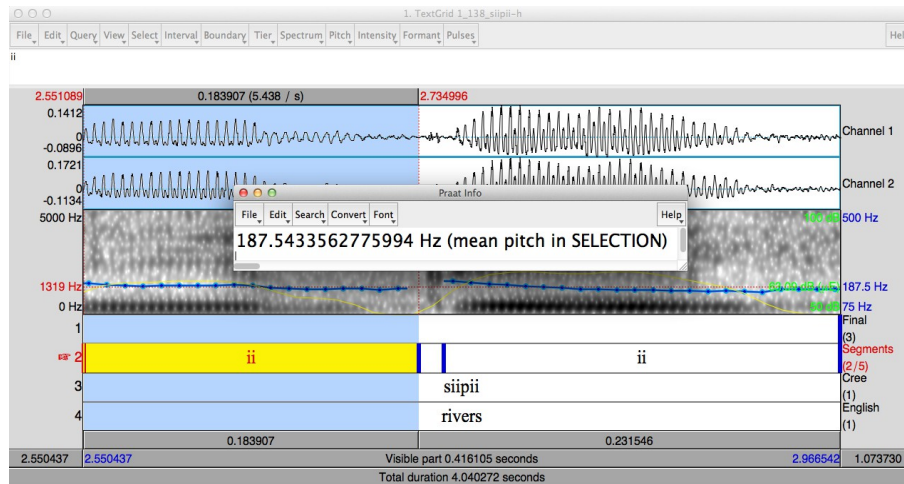
19 By “peak pitch”, I am referring to the measurement of pitch at the highest point in a given vowel. By average pitch, I am referring to the measurement of pitch throughout the duration of a vowel, including both the peak and nadir.

20 It should be noted that high vowels (such as /-i/ tend to have inherently higher f0s than low vowels (such as /-a/). This would cause a measurement issue if a word final /-a/ were to be preceded by an /-i/, as it might falsely indicate that the accent were on the /-i/. This issue is avoided in the present study, as that condition is not present word-finally in any of the words in the word list. Thanks to Dr. Kevin Russell for pointing this out.

(45) Measurement of pitch on final vowel



(46) Measurement of pitch on penultimate vowel

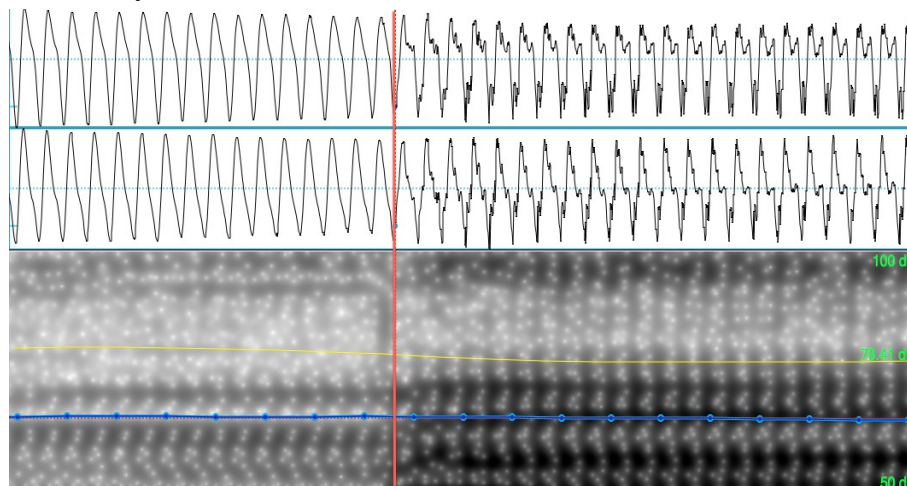


Where a vowel segment is adjacent to another voiced segment, I used the periodicity²¹ of the waveform and auditory cues to identify the beginning and end of each vowel segment. Often the adjacent voiced segment was a nasal consonant, in which case the vowel was easily identifiable by the higher amplitude (i.e., the darker region on the

²¹ Periodicity refers vibration of vocal folds at regular, measurable intervals.

spectrogram, as in (47)). Where two vowels occur adjacent to one another, again, I relied on the particular period patterns of each vowel segment supported by auditory cues to place the boundary separating the vowel segments.

(47) Periodicity of vowel waveform



The image in (47), captures the adjacent /m/ and /â/ segments in the token *chîmân* 'sweater'. The vertical line indicates where the vowel's periodicity begins. This is supported by the onset of darker formant structure indicating a higher amplitude and qualitative change in production. Additionally, to the immediate left of the vertical line is a slightly darker area of the spectrogram. This signals the release of the nasal stop, which is another indicator of the end of a nasal segment and the beginning of the vowel that follows it.

In this section I have identified my methods of data measurement. In the following section, I will outline how I analyzed my measurements for the purpose of addressing research questions 1 and 2 in Chapter 5, §2.

4. Data analysis

In this section, I review the findings from both the quantitative and qualitative analyses performed on the data. For the sake of clarity, below I have listed and characterized the keywords I selected in coding the results.

(48) Keywords

Speaker	Differentiates between tokens cited by LBS, JN, or MN. For example, given the sound file “1_004_miiwit” the speaker of the token “miiwit” is LBS.
Affix	Differentiates whether a word is morphologically-conditioned 'with affix' (i.e., has a / + h/ word-final morpheme) or phonologically conditioned 'without affix'. For example, given the sound file “1_004_miiwitt”, the token “miiwitt” is without affix because it is phonologically conditioned. It does not have a / + h/ morpheme word-finally.
Pitch location	Refers to whether a word is accented on the final or non-final accent. This differs from Affix in that words with and without the / + h/ affix are not necessarily accented on the final and non-final syllables respectively. For example, given the sound file “1_004_miiwit”, the token “miiwit” may have non-final pitch if the pitch is found on the segments “ii”.
Sibilant-final	Refers to a group of words ending in fricatives and affricates. These are measured separately from non-sibilant final words as the word final phenomena present among this word group is segment lengthening rather than aspiration. For example, the tokens “wiyas” and “nisikus” are sibilant final because they end in the fricative “s”.
Non-sibilant-final	Refers to a group of words ending in plosives, nasals, and affricates. These are measured separately from sibilant final words as the relevant word final phenomena is aspiration rather than segment lengthening. For example, the tokens “miiwit” and “uut” are non-

	sibilant-final because they end in the plosive “t”.
Segment	Refers to whether a word ends in a fricative or affricate in sibilant-final word group, or a plosive, nasal, or vowel in the non-sibilant-final word group.
Slope	A measurement obtained by taking the final syllable value (i.e. pitch or intensity level) and subtracting from it the non-final syllable value (i.e. pitch or intensity level). A positive slope indicates that pitch is higher on the non-final syllable, where as a negative slope indicates that pitch is higher on the word-final syllable. The slope measurement captures the difference, or degree to which the accented and non-accented syllable differ in terms of the value measured.
Accented pitch level	The absolute value of the pitch of the accented syllable in each word.
Accented intensity level	The absolute value of the intensity of the accented syllable in each word.

4.1. Quantitative results

I used the software package SPSS Statistics to run six sets of analyses of variance (ANOVA) on the data testing for effects on six dependent variables as follows:

- Pitch of accented syllables (see §4.1.1)
- Intensity of accented syllables (see §4.1.2)
- Slope of pitch change between accented and non-accented syllables (see §4.1.3)
- Slope of intensity change between accented and non-accented syllables (see §4.1.4)
- Word-final segment lengthening (see §4.1.5)
- Word-final aspiration length (see §4.1.6)

The independent variables I considered in all ANOVAs are:

- Affix (two way, with or without affix)
- Pitch location (two way, final or non-final)
- Speaker (three way, LBS, JN, or MN)

In two cases I consider a fourth independent variable, Segment, which is two way (fricative and affricate) in the sibilant-final word group or three way (nasal, plosive, and vowel) in the non-sibilant-final word group. I used univariate factorial ANOVAs as I was testing the effect of more than one factor on any given dependant variable. Due to the limited amount of data, (notably among JN's tokens), I did not run a separate ANOVA for each speaker.²²

In the following sub-sections I outline the results for each above-listed ANOVA. Each sub-section defines the terms of the ANOVA under discussion and addresses both the statistically significant and non-significant results. I provide a comprehensive interpretation of all findings in Chapter 5 §4.1.7.

4.1.1. Accented pitch level

I used a 3x2x2 one-way ANOVA to test whether the absolute pitch value of the accented syllable (referred to as 'accented pitch level') in words varies depending on (a)

²² My thanks to Dr. Paul De Decker for his advice on research design and statistical methods. Future studies on this topic would benefit from a larger data sample allowing for a within subjects design for each dependent variable, for each speaker separately, as per Dr. Paul De Decker's advice.

the three speakers, (b) whether the word is with or without affix, and (c) whether the accent is final or non-final, $F(11, 770) = 2.871$, $p = .001$.

SIGNIFICANT FINDINGS FOR ACCENTED PITCH LEVEL

The results of the 3x2x2 ANOVA reveal a significant difference among some conditions, $p = .001$. Between the three speakers and the pitch of the accented syllable, a post-hoc Tukey test showed the groups differed significantly, $F(2, 770) = 898.804$, $p = .001$. This finding, which illustrates that each speaker produces a unique average pitch level, is not linguistically significant as it is a consequence of having different sized larynxes. A post-hoc Tukey test also indicates a significant difference among the pitch locations, $F(1, 770) = 14.481$, $p = .001$. A combination of Speaker*Pitch location also reveals a significance through a post-hoc Tukey test between the groups, $F(2, 770) = 3.532$, $p = .030$. That is to say, each speaker individually produces a varying pitch level depending on whether the pitch is finally or non-finally placed. A post-hoc Tukey test also shows the interaction of Speaker*Affix*Pitch location accounts for most of the variation in pitch level on the accented syllable, $F(2, 770) = 3.849$, $p = .022$. As we will see later, each speaker produces four (not two) classes of words, and the way they use these classes is different for each speaker. The four classes are: (a) words with the / + h/ affix and final accent, (b) words with the / + h/ affix and non-final accent, (c) words with no affix and final accent, and (d) words with no affix and non-final accent. This finding, which is significantly different from previous descriptions of NE Cree, is discussed further in Chapter 6.

4.1.2. Accented intensity level

As discussed in Chapter 2, intensity in NE Cree is an acoustic correlate of pitch. Consequently, I used a 3x2x2 one-way ANOVA to examine whether the variation in the intensity of the accented syllable could be accounted for by three independent variables, (a) the three speakers, (b) whether the word is with or without affix, and (c) finally accented and non-finally accented word groups, $F(11, 770) = 14.858$, $p = .001$. The only significant finding, revealed through a post-hoc Tukey test was a difference between the three speakers and the intensity of the accented syllable, $F(2, 770) = 1311.851$, $p = .001$. That is to say that each individual speaker produces a unique level of intensity on accented syllables. This finding is not linguistically significant, however, but can be attributed to physiological differences between the speakers.

4.1.3. Slope of pitch change

After observing a total of four, not two, accentual patterns for words with and without /+h/, I engaged in measuring pitch slopes, in order to further characterize this unexpected result for reasons discussed below. Recall that a pitch slope is a measurement obtained by taking the final syllable value for pitch and subtracting from it the non-final syllable value for pitch. A positive slope indicates that pitch is higher on the non-final syllable, where as a negative slope indicates that pitch is higher on the word-final syllable. Evidence for an alteration in pitch slope with the addition of a /+h/ morpheme can be drawn from comparative evidence on pitch patterns in related Algonquian languages. Recall from Chapter 2 §4.3 that the /+h/ suffix derives

historically from a word-final short vowel, and in NE Cree, word-final short vowels are deleted (MacKenzie 1980). In the related Algonquian language Maliseet-Passamaquoddy, word-final vowels are also deleted, yet remain detectable through a rising inflection on the accented vowel (Teeter 1971). In NE Cree, rather than a rising inflection on a single syllable, I hypothesize that a level or rising pitch slope on two adjacent accented syllables is relevant.

I tested for the difference in pitch level between the final and non-final syllable in each word to see whether the variation in pitch slope could be explained by the independent factors, Speaker, Affix, and Accent location, $F(11, 766) = 4.904$, $p = .001$.

A post-hoc Tukey test reveals that some of the variation in pitch slope can be accounted for by the combination of Speaker*Pitch, $F(2, 770) = 10.386$, $p = .001$; in other words, each speaker alters pitch slope depending on whether a word is finally or non-finally accented. In addition, a second post-hoc Tukey test shows that some of the variation in the pitch slope can be accounted for by a combination of Affix*Pitch location, $F(2, 770) = 50.912$, $p = .001$. In other words, speakers alter the slope of pitch depending on whether a word is finally-accented accented with an affix, finally-accented without an affix, non-finally accented with an affix, or non-finally accented without an affix. (The adjusted r^2 value is .494, indicating that about half of the variation can be accounted for by these combinations of factors). This finding, however, reinforces the earlier finding that there are four distinct word groups:

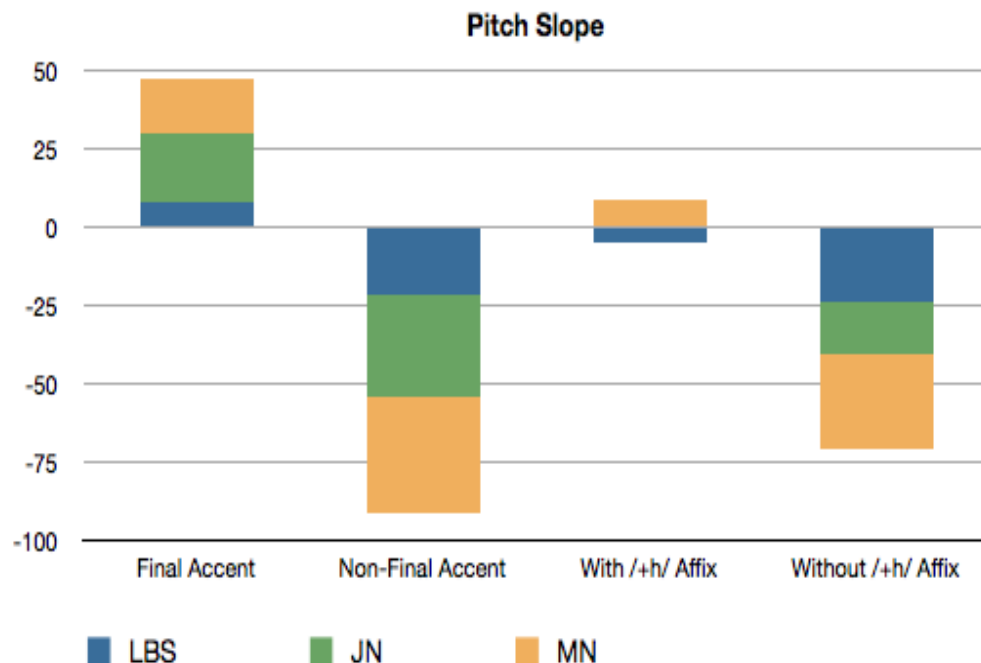
- Finally accented with the / + h/ affix
- Non-finally accented with the / + h/ affix
- Finally accented without the / + h/ affix

- Non-finally accented without the /+h/ affix

Different patterns of pitch slope are observed in each of these four word patterns.

More specifically, as shown in (49), all three speakers have a significantly steeper slope of pitch change in words with a non-final accent as compared to words with a final accent. This pattern is mirrored in each speaker in the slope of pitch change in words that are without affix and those that have the /+h/ affix. In other words, when a word has the /+h/ affix and is finally accented, the slope of the pitch change becomes more level. Whereas, if a word is without affix and non-finally accented, the slope of the pitch change is greater and is negative (falling).

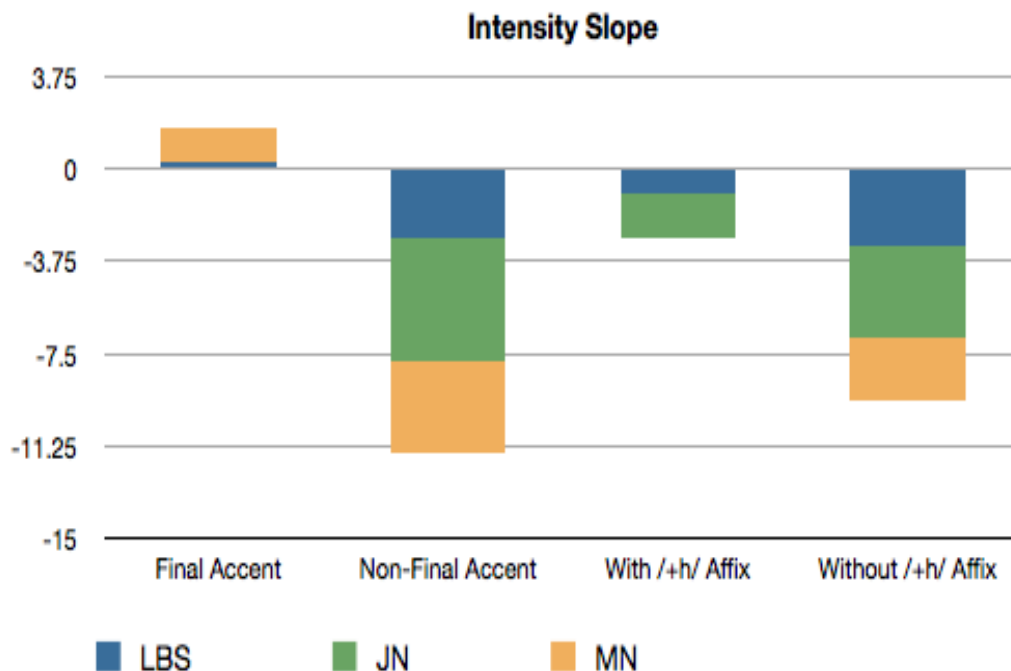
(49) Slope of pitch change between accented and non-accented syllables



4.1.4. Slope of intensity change

As discussed in Chapter 2, intensity in NE Cree is an acoustic correlate of pitch. For this reason, I used a 3x2x2 one-way ANOVA to determine whether the variation in the intensity slope could be accounted for by the independent variables of Speaker, Affix, and Accent location, $F(11, 770) = 4.978$, $p = .001$. While some of the results were significant, the adjusted r^2 value (0.142) indicated that little variation in the slope of intensity could be accounted for by the independent variables. However, as shown in (50), the slope of intensity change pattern mirrors the patterns of the slope of pitch change.

(50) Slope of intensity change between accented and non-accented syllables



The four ANOVAs discussed above looked at possible prosodic cues to the presence the /+h/ affix. The ANOVAs I go over in the following sub-sections pertain to segmental cues to the presence of the /+h/ affix.

4.1.5. Word-final segment lengthening (sibilant-final words)

Recall from Chapter 2, word-final segments /s/, /ʃ/, and /tʃ/ are impressionistically lengthened in finally accented words with the /+h/ affix. If so, it is possible that individual sibilant segments differ in lengthening patterns.

Using data from sibilant-final words (i.e., words ending in fricatives /s, ʃ/ and affricate /tʃ/), I used a 3x2x2 one-way ANOVA to determine whether variation among, (a) the three speakers, (b) whether a word is with or without a /+h/ affix, and (c) finally accented and non-finally accented word groups with relation to word-final segment lengthening as the dependent variable, $F(11, 182) = 10.881, p = .001$. I ran second one-way ANOVA as a 3x2x2x2 factorial design including the above factors (a) through (c), as well as differences among (d) words ending in continuants and affricates, $F(21, 172) = 8.476, p = .001$. This second ANOVA tests whether there is a difference in lengthening among individual word-final sibilant segments.

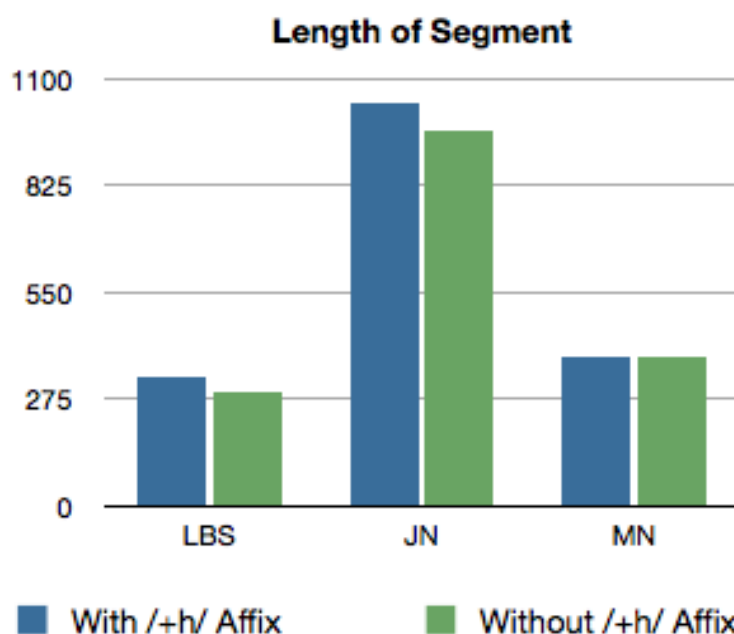
SIGNIFICANT FINDINGS FOR WORD-FINAL SEGMENT LENGTHENING

The results of both the three-way and four-way ANOVAs examining word-final sibilant lengthening reveal a significance. A post-hoc Tukey test shows significant difference between the three speakers and the lengthening of the final segments, $F(11, 182) =$

35.056, $p = .001$. This finding demonstrates that each speaker has different patterns of word-final sibilant lengthening.

As shown in (51), although the effect of Affix is not statistically significant, there is a trend, $F(1, 82) = 3.453$, $p = .065$. LBS and JN both tend to lengthen sibilants when a /+h/ affix is present, whereas MN does not tend to lengthen in either case.

(51) Segment lengthening by speaker



4.1.6. Word-final aspiration length (non-sibilant-final words)

Recall from Chapter 2, non-sibilant segments (plosives, vowels, and nasals) are followed by aspiration when in a word-final position. Such aspiration appears impressionistically longer in finally accented words with a /+h/ affix. Using data from non-sibilant-final words (i.e., words ending in plosives, nasals, and vowels), I used a 3x2x2 one-way

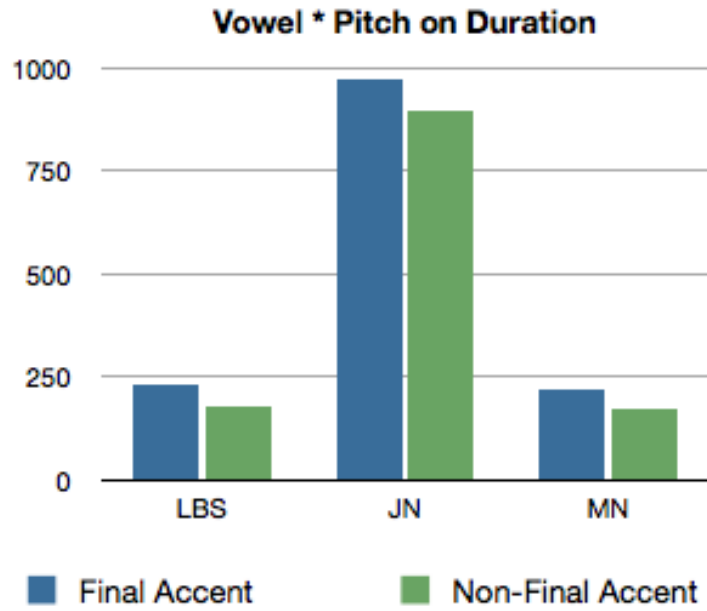
ANOVA to examine variation among, (a) the three speakers, (b) whether the word is with or without affix, and (c) finally accented and non-finally accented word groups with relation to word-final aspiration length as a dependent variable, $F(11, 679) = 19.868$, $p = .001$. I also ran an alternate version of this one-way ANOVA as a $3 \times 2 \times 2 \times 3$ factorial design to include differences among (d) words ending in plosives, nasals, and vowels $F(33, 657) = 8.396$, $p = .001$. The goal of this follow-up ANOVA was to determine if the length of aspiration depends on whether a word-final segment is a plosive, a nasal, or a vowel.

SIGNIFICANT FINDINGS FOR WORD-FINAL ASPIRATION LENGTH

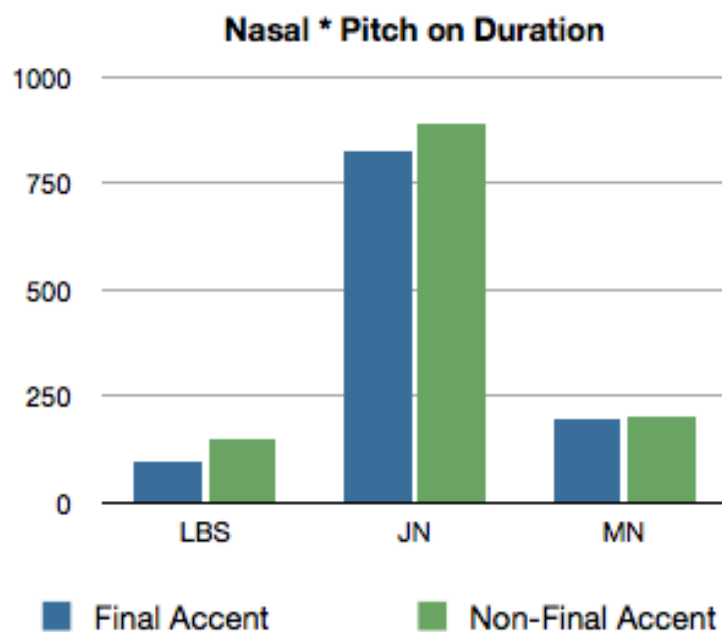
The results of the $3 \times 2 \times 2$ ANOVA and the $3 \times 2 \times 2 \times 3$ ANOVA examining aspiration length reveal significance among the groups. A post-hoc Tukey test shows a significant difference between the three speakers and the length of word-final aspiration, $F(2, 679) = 989.406$, $p = .001$. This finding, also found in the ANOVA examining sibilant lengthening, demonstrates that each speaker produces an aspiration length distinct from one another. A second post-hoc Tukey test also indicates a significant variation among Speaker*Affix and the length of aspiration, $F(2, 679) = 3.317$, $p = .037$. That is to say, each speaker varies the length of aspiration following non-sibilants in words with and without the /+h/ affix. LBS lengthens aspiration when words do not have a /+h/ affix, opposite to what we predicted, whereas MN lengthens aspiration in words with a /+h/ affix. JN does not differentiate between the length of aspiration following words in either category.

The results of a follow-up 3x2x2x3 ANOVA among the following variables also indicate a significant variation among the groups. Post-hoc Tukey tests reveal the following significance Segment ($F(2, 657) = 4.436, p = .012$), Speaker*Segment ($F(4, 657) = 10.261, p = .001$), and Pitch location*Segment ($F(2, 657) = 4.574, p = .011$). This shows that aspiration length depends on a combination of where the pitch is located and what the word-final segment is. Overall, the length of aspiration following vowels is significantly longer in the word-final accent pattern in all three speakers, as shown in (52a). All speakers also pattern alike in lengthening post-nasal aspiration in non-finally accented words more than finally-accented words (in (52b), which is opposite to the previously-observed pattern. Word-final aspiration in finally and non-finally accented words ending in a plosive pattern differently in each speaker, illustrated in (52c).

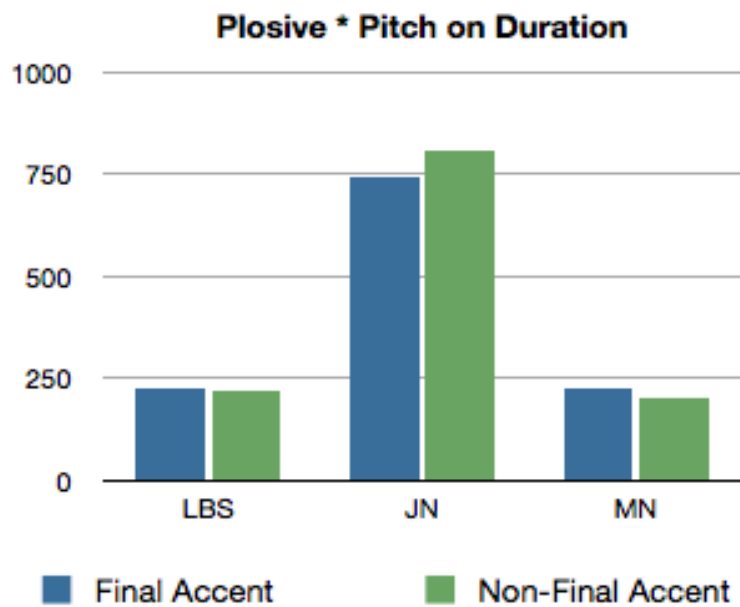
- (52) Segment*Pitch on duration of aspiration
a. Aspiration length following vowels



b. Aspiration length following nasals



c. Aspiration length following plosives

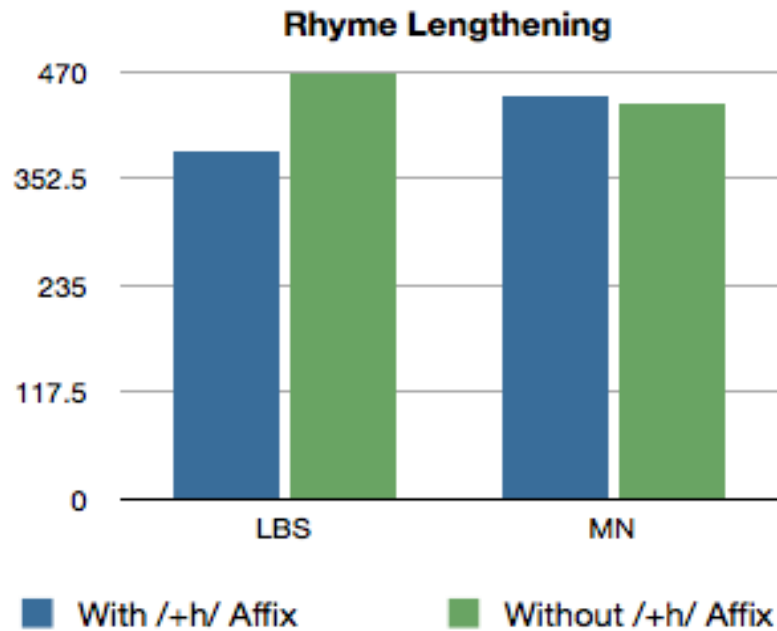


EXCURSUS ON RHYME LENGTH

While the above findings show some trends, there is also a lot of noise in the data. For this reason, I decided to look at variation in the overall length of the rhyme in the speech of LBS and MN, in order to uncover a potential pattern affecting this dimension of the signal. I reasoned that measuring for rhyme length could reveal any patterning that might otherwise be obscured through the gestural overlap between segments and aspiration.

I took a series of word pairs (one with the /+h/ affix and one without) which all end in the sequence *ân*. I measured a total of 17 word pairs from LBS and 13 from MN. An example word pair is: *chîmân* 'large ship' and *chîmân(+h)* 'large ships'. I measured the total length of the rhyme, *ân*, of each word pair. The results of this test are illustrated in (53) below.

(53) Rhyme length by speaker



The measurements of rhyme length reveal a difference in patterning between LBS and MN, and thus support the findings about aspiration length as illustrated in (53) above. LBS tends to have both a longer rhyme length and a longer aspiration length in words without a /+h/ affix. MN, on the other hand, tends to lengthen rhyme and aspiration words with a /+h/ affix. While not statistically significant, this shows that any variation in gestural overlap between final aspiration and the preceding segment, does not obscure the patterns previously observed. LBS and MN do indeed diverge in how they lengthen both aspiration and rhyme in words without the /+h/ affix and words with the /+h/ affix, respectively.

LBS and MN, however, display opposite patterns. I speculate that this could be due to sub-dialectal differences. Recall that LBS speaks Coastal Northern East Cree,

whereas MN speaks Inland Northern East Cree. Alternatively any differences could be generational, since LBS is older than MN. Further investigation is needed, with a larger sample of speakers.

4.1.7. Interim summary of quantitative results

The goal of this study is to determine the phonetic correlates of the presence or absence of the /+h/ suffix. My analysis so far reveals several interesting findings, which I summarize in this section.

The findings do not provide any conclusive evidence that the length of word-final segments and rhymes are a reliable cue for the presence or absence of the /+h/ affix in my data. A larger speaker set, representing each sub-dialect and other speaker variations, is needed to detect if there is a pattern between the /+h/ affix and the length of word-final segments and rhymes. Moreover, the findings from my data do not support previous descriptions that accent shifts from the non-final to the final syllable when the /+h/ affix is suffixed onto a word. The chart in (54) illustrates the percentage of tokens on which the accent is on the final syllable when a /+h/ accent is present. The chart in (55) illustrates the percentage of tokens where the accent is non-final when the /+h/ is not present.²³

23 Whether accent is final or non-final in any given word was determined through acoustic measurements of mean pitch value. If the average pitch of the non-final vowel was higher than the final vowel, I considered accent non-final. If the average pitch of the final vowel was higher than the non-final vowel, I considered accent final.

(54) Words with a / + h/ affix

	LBS	JN	MN
% final accent	44%	55%	78%

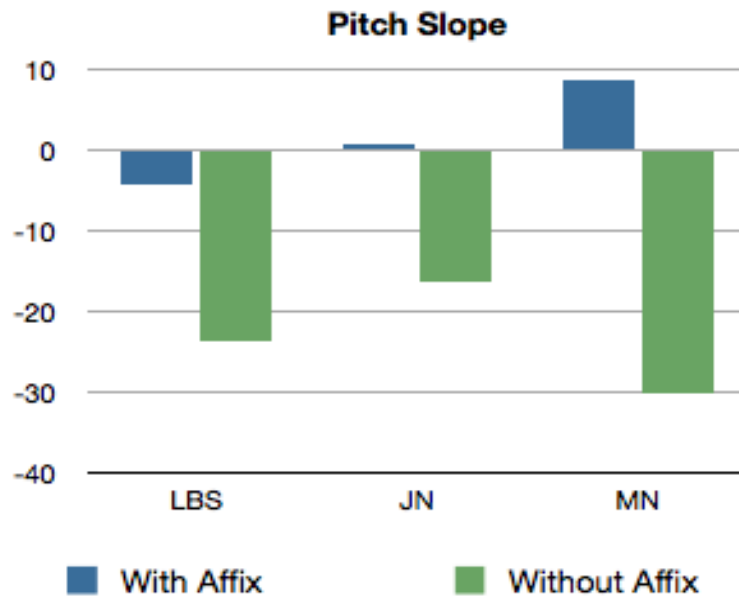
(55) Words without a / + h/ affix

	LBS	JN	MN
% non-final accent	85%	61%	79%

What I did discover, however, is that all speakers produce four types of words: finally accented words with the / + h/ affix, finally accented words without the / + h/ affix, non-finally accented words with the / + h/ affix, and non-finally accented words without the / + h/ affix.²⁴ Moreover, there is a relationship between the addition of the / + h/ affix and the levelling of pitch slopes. The images in (56) illustrate that when the accent is non-final, the pitch slope is greater, and falling, yet when the accent is final, the pitch slope becomes more level.

24 The four categories of words are behavioural categories. Each speaker displays four different types of phonetic patterning, rather than the two types of phonetic patterning implied by the phonological description of accent.

(56) Pitch slope



These findings lead us to explore the cause of the patterning of the pitch slope observed. One possible influence I explored is the change in voice quality from modal to creaky voice as previously discussed in Chapter 2 §5.1 and Chapter 5 §3.1.4. I expand upon the qualitative study analyzing changes in voice quality in the following section.

4.2. Qualitative results

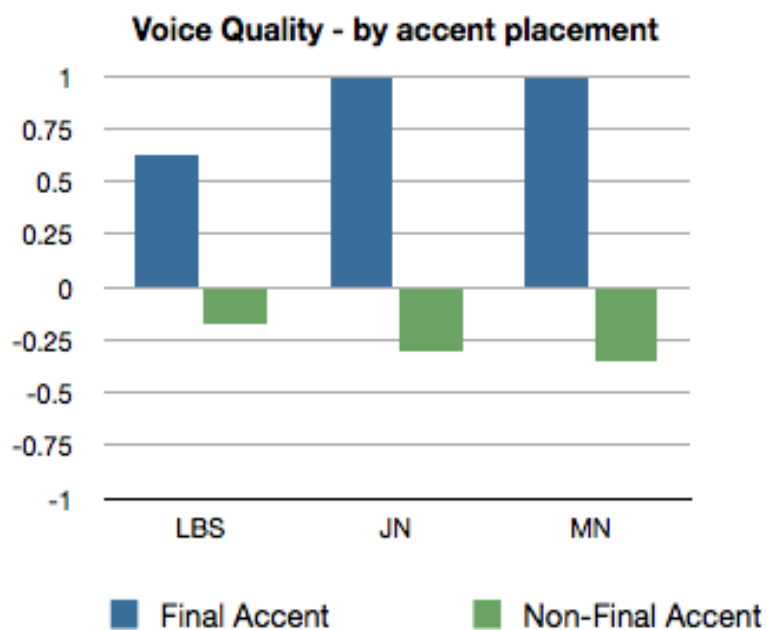
Recall that we observed creaky voicing in word final citation forms without the /+h/ affix. It is also well known that creaky voice affects (i.e., lowers) pitch (Dyck, p.c.. January 2012). It is thus important to investigate whether voice quality is affecting the pitch slopes observed, in order to determine whether speakers use a combination of creaky voicing and pitch slope in linguistically meaningful ways.

I coded for voice quality categorically, with '1' representing modal voice and '-1' representing creaky voice. I determined whether words ended in creaky voice impressionistically, according to auditory cues and striation patterns in the waveforms. Recall that creaky voice is characterized by widely spaced, sporadic vertical striations. In the following section I identify trends in voice quality patterning in all three speakers with respect to where the accent is placed (finally or non-finally) and whether a word is with or without affix. I will show that, as before, each speaker varies in their voice quality pattern. I explore this variation subsequently, in §4.2.1.

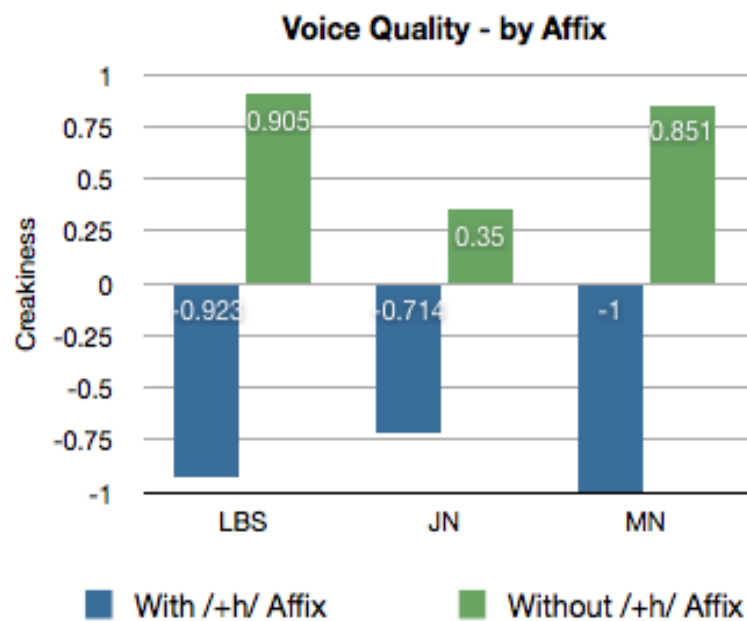
4.2.1. General trends

The charts in (57) and (58) capture the average amounts of each voice quality in finally and non-finally accented words, and in words with and without the /+ h/ affix, respectively. As shown in (57), in the speech of all three speakers, the final vowel in finally accented words tends to be more modal in voicing and the final vowel in non-finally accented words tends to have creaky voicing.

(57) Voice quality of sonorants – by accent placement



(58) Voice quality of sonorants – by Affix



As shown in (58), in the speech of all three speakers, the final sonorant in words with the /+h/ affix has modal voicing and the final sonorant words without the /+h/ affix is often creaky voiced in the speech of all three speakers.

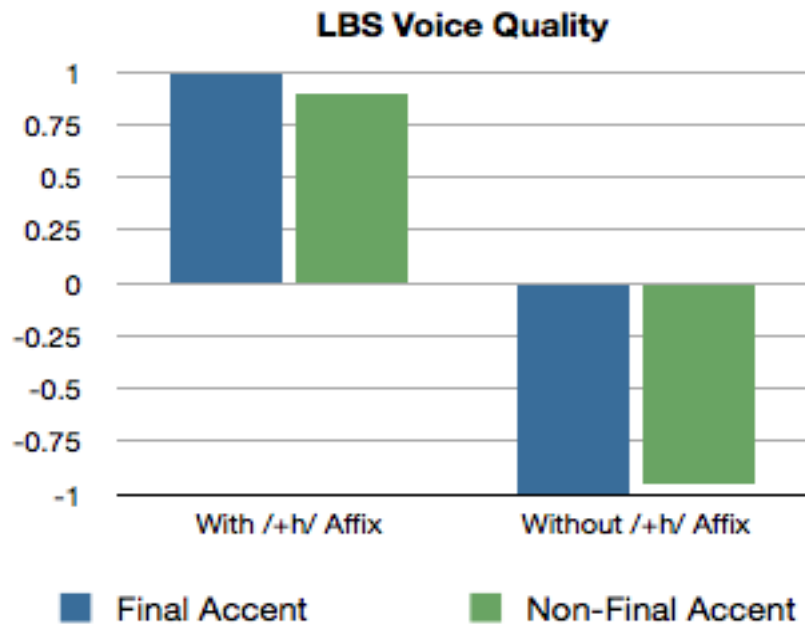
I hypothesize that a combination of modal voice, creaky voice, pitch slope, and accent location are cues help to distinguish between words with and without the /+h/ affix.

Recall that in the speech of all three speakers, some words with the /+h/ affix are (unexpectedly) non-finally accented and some words without the /+h/ affix are unexpectedly finally accented, but that the speakers do not otherwise display the same trends (see 4.1.6). I reexamine these findings in light of the findings on creaky voicing below.

SPEAKER ONE: LBS

As shown below in (59), LBS shows a clear pattern: regardless of whether a word is finally or non-finally accented, words without /+h/ have creaky voicing and words with /+h/ have modal voicing.

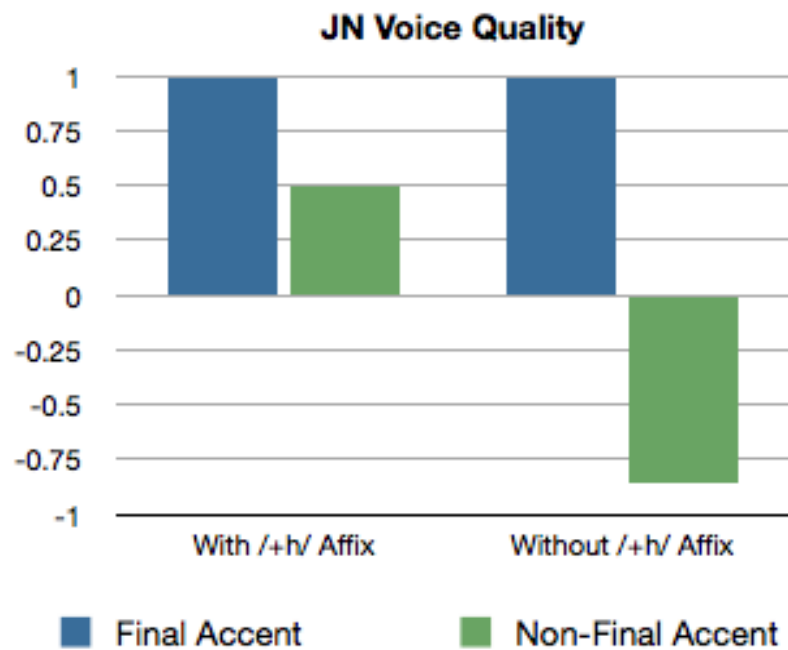
(59) Voice quality by both accent location and affix – LBS



SPEAKER TWO: JN

The voice quality pattern JN follows is less clear-cut than that of LBS. Like LBS, JN has modal voicing in the final vowel of words with /+h/, regardless of whether the accent is word-final or not. In words without /+h/, on the other hand, JN only has creaky voicing in the final vowel of non-finally accented words.

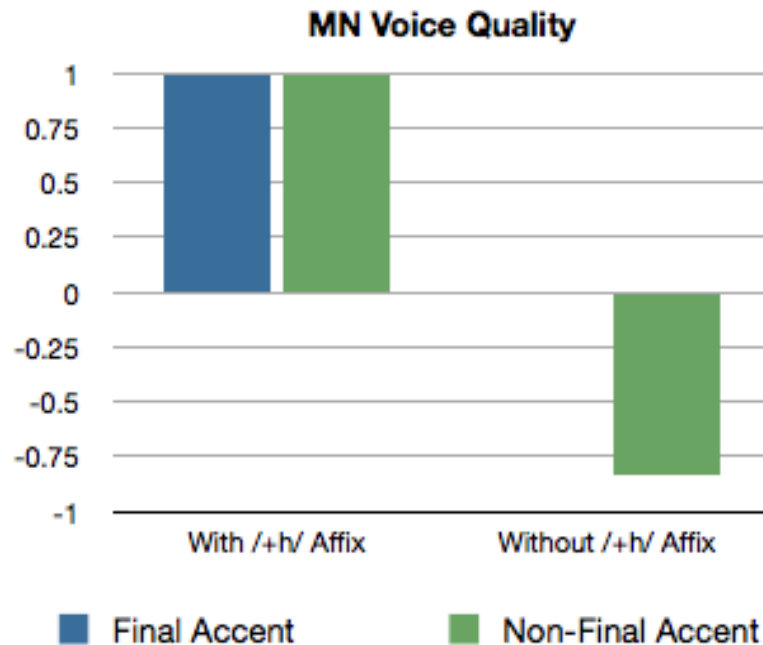
(60) Voice quality by both accent location and affix – JN



SPEAKER THREE: MN

Like LBS and JN, MN has modal voicing in the final vowel of words with final /+h/, regardless of whether the accent is final or not.

(61) Voice quality by both accent location and affix – MN



MN never produces finally accented words without affix in my data. However, like LBS and JN, MN has creaky voice in non-finally accented words without the /+h/.

INTERIM SUMMARY

In sum, all three speakers pattern alike in producing word-final modal voicing on sonorants when a word ends with /+h/, regardless of where the accent is placed. Similarly, all speakers use creaky voice in words without the /+h/ that are non-finally accented. Where they differ is in words without the /+h/ that are finally-accented. Overall, voicing is a reliable indicator of the presence of the /+h/; while less clear, creaky voice may be a cue to the absence of the /+h/ affix in words in isolation.

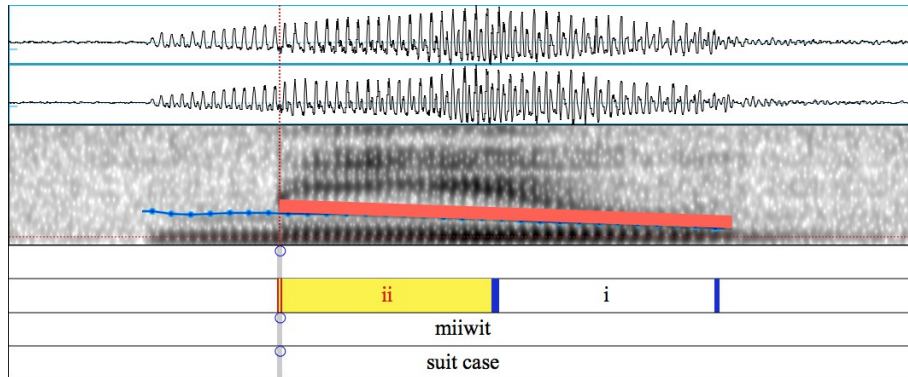
4.3. The relationship of voice quality to pitch slope

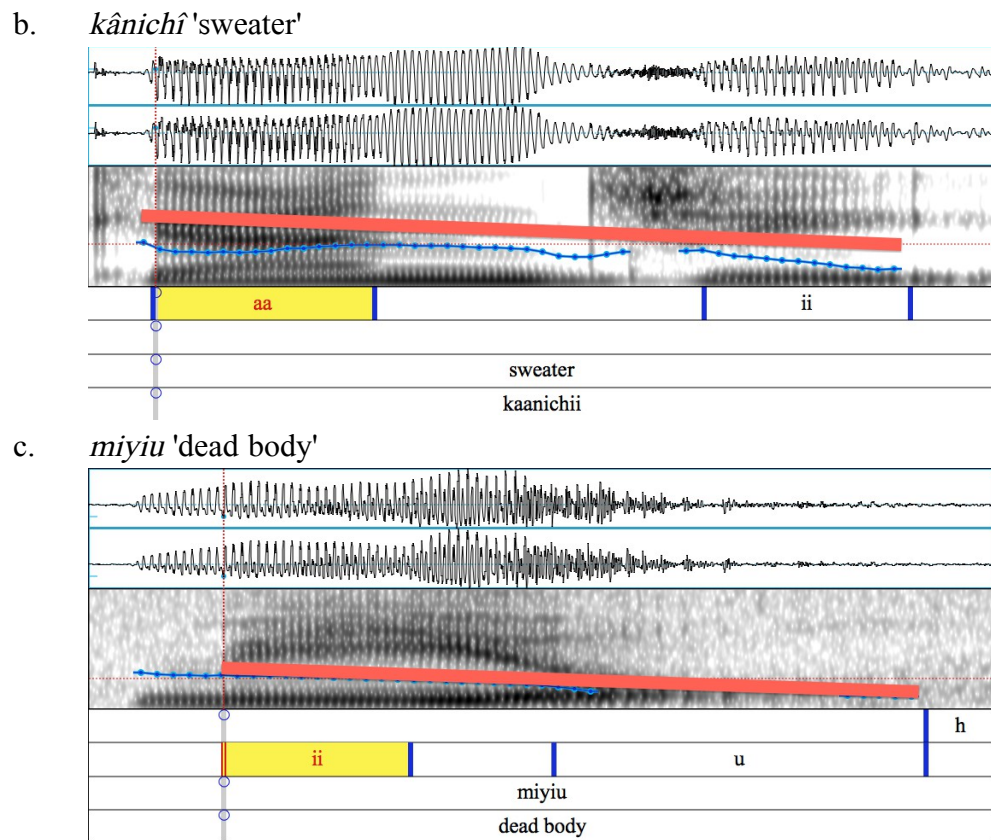
The findings from the above qualitative study of voice quality change show that there may be a relationship between voice quality and pitch slope. That is to say, the addition of a /+h/ affix patterns with modal voicing. Conversely, when a word is without the /+h/ affix, the word tends to end in creaky voicing. The creaky voicing results in a greater drop in pitch between the non-final and the final syllable, and thus serves to enhance the non-final pitch accent. In contrast, modal voicing does not perturb pitch, and so does not affect the pitch slope.

Compare the images in (62) to those in (63). The images in (62a) through (62c) are examples of words that have no affix and have a steep pitch slope. The pitch slope, illustrated in Praat with a solid blue line, has been accentuated with a thick red line for ease of viewing. The slope of the red line in each word without affix is characterized by a downward slope from the penultimate to the ultimate vowel: the pitch on the penultimate vowel is higher than the pitch on the ultimate vowel.

(62) Steep pitch of words with no affix

a. *mîwit* 'suit case'

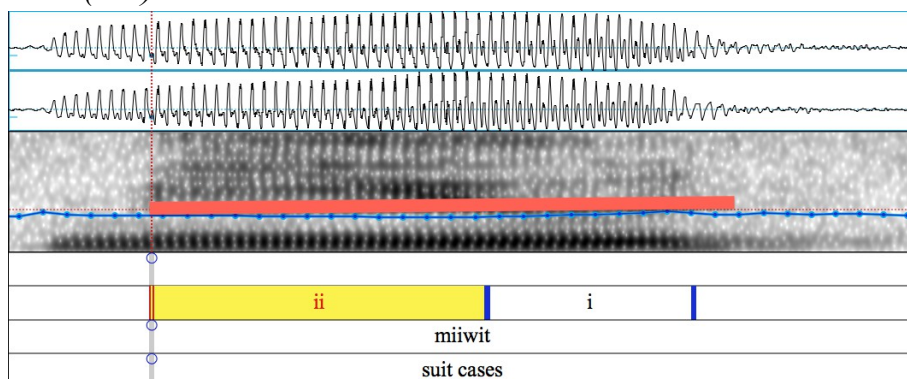




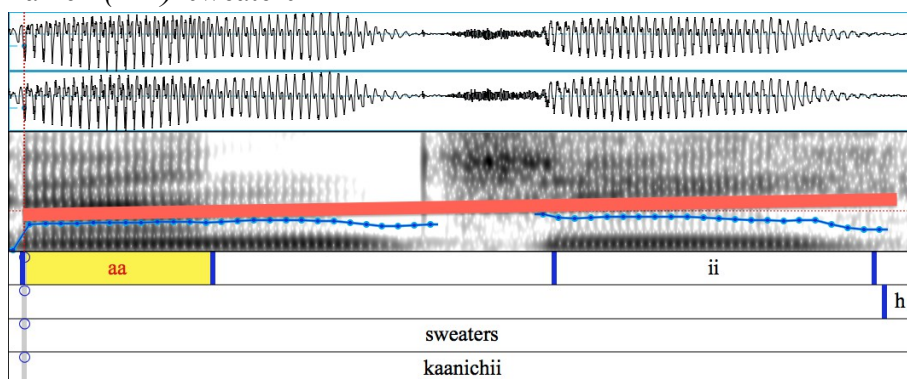
The counterparts (i.e., words with the / + h/ affix) for the words in (62) are provided in (63a) through (63c) below. The red line in words with the affix, representing pitch slope, is either less steep than that of the word without the affix, level, or rising.

(63) Levelling of pitch of words with the /+h/ affix

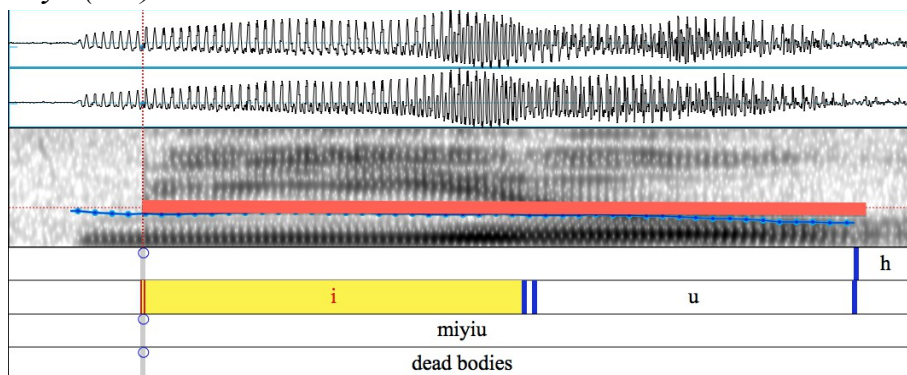
a. *mîwit(+h)* 'suit cases'



b. *kânichî(+h)* 'sweaters'



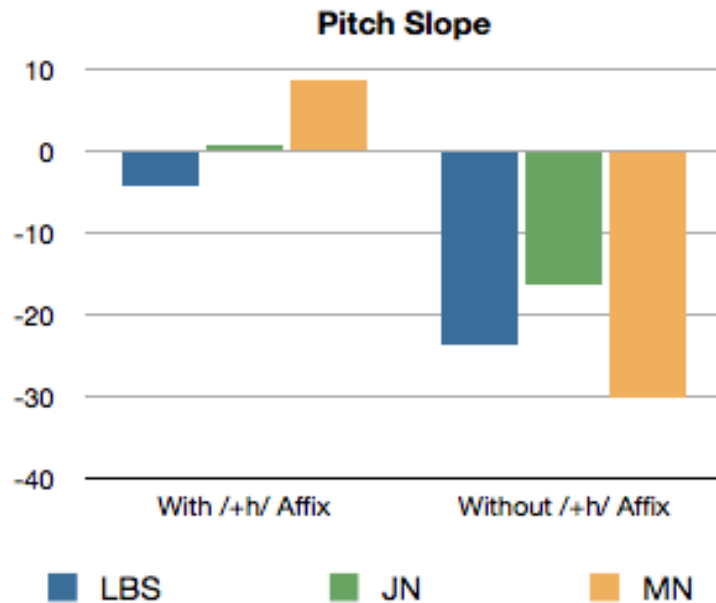
c. *miyiu(+h)* 'dead bodies'



As shown in (64), regardless of whether the word is accented finally or non-finally, the pitch slope value is much closer to zero in words with an /+h/ affix. The result is a

level or somewhat rising pitch between the non-final and final syllables in words with a / +h/ affix.

(64) Pitch slope



Based on this observation, I claim that the falling pitch slope in words without the / +h/ affix is enhanced by creaky voice, or the feature [+constricted glottis]; the effect is to make the fall in pitch more salient. The purpose of an enhancing feature is to make an articulatory gesture, such as pitch accent, more perceptually salient (Stevens & Keyser 2010).²⁵

25 The use of phonetic strategies by speakers to enhance phonological contrasts is a common phenomenon cross-linguistically. To take an example from Dutch, the Maastricht dialect makes use of duration of the stressed syllable to enhance the contrast between two tones, Accent 1 and Accent 2 (Gussenhoven 2011). Since syllables with Accent 1 tend to be shorter and more open, compared to syllables with Accent 2. Since high vowels are perceived by listeners as longer and low vowels as shorter, Gussenhoven finds that speakers tend to use lower syllables with Accent 2 and raise syllables

In contrast, in words with the /+h/ affix, the pitch slope is level. I propose that one way to account for this fact is to posit that such words have a pitch accent on the non-final syllable. Since there is no drop in pitch, they must have a pitch accent or high tone on the final syllable as well. This leads to my second claim that the /+h/ affix might be represented phonologically as /+H/, i.e., a grammatical high tone.

Returning to NE Cree, if the /+h/ morpheme is accented, I hypothesize that underlyingly it has a phonemic H (high) tone. In addition, I hypothesize that this H tone interacts with a H tone that is metrically assigned to non-final, pitch-accented syllables. When no /+h/ affix is present word-finally, there is no H tone word-finally, but still an H tone (pitch-accent) non-word-finally. In this case, to emphasize the lack of a H-toned affix, speakers might increase the falling pitch slope between the non-final H-toned syllable and the final syllable, which lacks H tone, by means of adding an enhancement feature [+constricted glottis], which would serve to lower pitch even further, given the pitch-lowering effect of the creaky voicing resulting from glottal constriction. Speakers might also choose to not use the enhancement feature [+constricted glottis] in this situation, resulting in a falling word-final tone pattern which does not have as steep a falling pitch slope. In contrast, when a word has an /+h/ affix word finally, it would have two H tones, one on the word-final /+h/ affix, and one on the non-finally accented syllable. Pitch would therefore remain level and the phonation of the final syllable would not be affected.

with Accent 1. That is to say, raising long vowels or lowering short vowels serves to enhance durational differences, creating a longer tone contrast.

In the following section, I return to the two research questions of this study, and restate my conclusions in phonemic terms, drawing from findings in the results in section Chapter 5 §4 and interpretation in section Chapter 5 §4.3.

Chapter 6: Discussion

This study was designed to address two research questions, which are repeated below in (65) and (66).

(65) Research Question 1: Does the suffixation of the metrically relevant / + h/ morpheme prompt a difference in pronunciation?

(66) Research question 2: How does accent or accent shift relate to RQ1?

Regarding RQ1, I have shown that the addition of an / + h/ suffix does concretely reflect a difference in pronunciation. Each speaker differentiates between words with the / + h/ affix and words without the / + h/ affix, albeit in different ways.

With respect to RQ2, I have shown that accent shift does not exist, contrary to what is described in the earlier literature on the topic. Instead, words without / + h/ have a falling tone pattern, whereas words with / + h/ have a level tone pattern. My proposal represents a departure from previous descriptions, which claim that accent shift, not accent addition, is the primary cue to the presence of the / + h/ affix.²⁶ However, previous findings were impressionistic (MacKenzie 1980), or based on data from one speaker only (Dyck 2012).

The table in (67) summarizes the differences in pronunciation of words with and without the / + h/ affix by speaker.

²⁶ I use the term “primary cue” because I found pitch to be probabilistically the most reliable cue. This is not to say that other phonetic cues such as accent shift and aspiration length do not also play a role. My results suggest that these cues are still present, yet provide weaker cues to accent placement.

(67) Difference in pronunciation

	Absence of / + h/ affix	Presence / + h/ affix
LBS	Lengthens aspiration Creaky voicing word-finally Falling pitch slope	Tends to lengthen sibilants Modal voicing word-finally Level or rising pitch slope
JN	Falling pitch slope	Tends to lengthen sibilants Modal voicing word-finally Level or rising pitch slope
MN	Creaky voicing word-finally Falling pitch slope	Lengthens aspiration Modal voicing word-finally Level or rising pitch slope

With respect to RQ1, for words with the / + h/ affix, one speaker (MN) lengthens word-final aspiration, but the other two speakers do not. (This finding suggests that Dyck's (2012) observations (Chapter 2 §4) do not generalize to all speakers). Also with respect to RQ1, two speakers add creaky voicing to words without the / + h/ affix.

With respect to RQ2, for words with the / + h/ affix, all three speakers systematically level (or even raise) the pitch slope and maintain modal voice quality in the last vowel in words with the / + h/ affix. In contrast, they all tend to use falling pitch in words without the / + h/ affix.

I suggest the following phonemic explanation for my findings about pitch slope, creaky voicing, and modal voicing.

(68) Phonemic representation of accent shift

Pitch accent and no / + h/ affix	Pitch accent and / + h/ affix (high-toned)
H	H + H
	- - - - -
V < V > #	V V + Ø
Phonetically: falling with creaky voice, or at least not level	Phonetically: level or rising

As shown in (68), a word with no / + h/ affix would be phonemically represented as having one pitch accent on the non-final syllable. Phonetically, the accented syllable is produced with a relatively high pitch as compared to the final syllable. This creates a falling pitch contour from the non-final to the final syllable.

In contrast, a word with the / + h/ affix would be phonemically represented with a pitch accent on the non-final syllable, and a second accent on the final syllable, contributed by the / + h/ affix. Phonetically, this would result in a level (or somewhat rising) pitch pattern.

I have also shown that the pitch patterns, which are cues to the presence or absence of the final / + h/ morpheme, can optionally be enhanced by other cues. For example, two speakers use [+constricted glottis] - creaky voicing – to enhance the falling pitch that signals the lack of the / + h/ morpheme. Another speaker, MN, lengthens the aspirated release after the final consonant, and lengthens final fricatives in words with the / + h/ morpheme; I tentatively interpret this phonologically as MN filling the null nucleus that is part of the phonemic representation of the / + h/ morpheme with non-vocalic content.

If the kind of variation described above is not due to measurement error, it could be dialectal, or generational. However, my data sample was not designed to address such questions, and further investigation is required.

In conclusion, my findings suggest that the /+h/ affix is a H-toned null vowel. The H tone of the /+h/ affix prevents a fall in pitch after the non-final pitch accent. The null vowel that forms part of the phonemic representation of the /+h/ affix can be filled by phonetic content (aspiration, consonant lengthening), under conditions that appear to be subject to dialectal or generational variation. Here, I suggest dialectal or generational variation quite tentatively, as further investigation is needed. The tendency for MN to use non-vocalic content to fill a null nucleus raises an interesting question concerning what phonetic material may be used in this position? While I do not address this question here, it presents an interesting opportunity for further study. Additionally, the findings presented in this thesis describe the /+h/ affix under a different light from previous literature, and also present several avenues for future research in the representation of the /+h/ affix, and more generally, in dialectal or generational variations in NE Cree.

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Appendix I: Animacy²⁷

Gender, a grammatical distinction found in many of the world's languages, divides nouns into two or more classes. In many Indo-European languages, for example, nouns may be masculine, feminine, or neuter (Corbett 1991). Gender may also be reflected, through morphological 'agreement', on the words with which such nouns enter into a relationship. A familiar example from French is the gender agreement between a noun and its determiner ('le' or 'la') and any modifying adjectives:

- | | | |
|-----|----------------------|----------------------|
| (1) | la gentille fille | le gentil garçon |
| | 'the kind(fem) girl' | 'the kind(masc) boy' |

In Cree (and in Algonquian languages in general), the gender distinction is based on the semantic notion called animacy; nouns which denote real-world animate entities (e.g., people, animals, plants) are animate in gender, while real-world inanimate entities are classed as grammatically inanimate (Quinn 2001). There are a few exceptions to this pattern: approximately 400 real-world inanimate nouns are classed as animate (Marguerite MacKenzie, p.c., January 2012). The singular Cree noun is not formally marked for gender, but, as shown in (1), gender distinctions are made in the plural. Example (2) illustrates the addition of the /+h/ suffix to encode plurality on the inanimate noun 'shoe'.

²⁷ This appendix is adapted from a project proposal written as a part of a Social Sciences and Humanities Research Council Scholarship, in consultation with Dr. Julie Brittain.

- (2) *pâyikw mischin(h)* *nîshu mischin(+h)*
 'one shoe' 'two shoes'

Appendix II: Obviation

In NE Cree, and Algonquian languages in general, all third person full nominals must be morphologically marked for either proximate (unmarked) or obviative (Junker 2004).

The proximate/obviative distinction is encoded in the grammar as a means to track references by distinguishing between more than one third person arguments (Muehlbauer 2012). This distinction is made by ranking third person nominals according to factors such as grammatical function and semantic properties (Aissen 1997). The nominal marked for proximate is that which is ranked highest in a phrase relative to all other third person nominals in the same phrase. All other third person nominals within the same discourse must be marked for obviative (Junker 2004). In a discourse segment, the nominal marked for the proximate tends to have a topicalizing effect (Junker 2004). That is to say, the nominal marked with proximate may be interpreted as the topic of the phrase. Obviation can therefore be described as a discourse mark of 'nontopicality'.

In example (1), 'John' is the unmarked proximate nominal, and 'pancake' is marked with the obviative /+h/ suffix.

(1) Obviation

John waapimaau panikik(+h)

'John sees the pancake'

The proximate marking is considered the unmarked category, as when only one third person nominal appears it is obligatorily proximate (Aissen 1997). Example (2) shows an instance of proximate marking in the related language, Plains Cree. In (2a), the third

person nominal *atim* ('dog') appears in the unmarked proximate as it is the only third person nominal present. In (2b), by contrast, *atim* ('dog') is marked for obviative (marked with *-wa* in Plains Cree) because the higher ranking *napew* ('man') receives the proximate marking (Aissen 1997).

(2) Proximate marking in Plains Cree (Aissen 1997)

- a. *niwapamaw atim*
 see dog
 '(I) see the dog'
- b. *pakamahwew napew atimwa*
 hit man dog
 'the man hits the dog'

Appendix III: Final Word Lists

(1) LBS

1_001_muusuyaas	moose meat
1_002_piskustihchaau	they are rises
1_003_nitiyim	my person/my child
1_004_uut	canoe
1_005_mitukihp	deserted camps
1_006_niimaawiniwit	lunch bags
1_007_misinihiikinaachiniwit	cardboard/paper boxes
1_009_aaniskiwikinitihchaan	They grow/are placed here and there.
1_010_uhkumis	her/his uncle
1_011_muuhkumaanish	pocket knife
1_012_pipunikaan	winter dwelling
1_013_miinaapuu	The berry is juicy.
1_014_muushtaau	forest fire
1_015_kaanichii	sweaters
1_016_uchaapaanish	car
1_018_muusuyaas	moose meat
1_019_miichim	food
1_020_kuskusch	cross-bar on snowshoes
1_021_uwaatinikuhp	wedding dress
1_022_aamiiukihp	spawning places
1_023_mitukihp	deserted camp
1_024_miiwit	suitcase
1_025_uskaataayaapii	plant roots/stems – lit. leg strings
1_026_chaachishaapaayaaukuhp	house coat
1_027_muuhkumaanish	pocket knives
1_028_wiiyisht	its feet
1_029_maaschiisk	John sees the cedar tree.
1_030_muuhkumaan	knife
1_031_mihtihkaan	wood pile
1_032_mihtiwikii	ears
1_033_niwiitimus	my sister/brother-in-law
1_034_uschikimikw	new dwelling
1_035_paashtaaumiichim	dried meat
1_036_chaachishaapaayaaukuhp	house coats
1_037_wiyaas	meat
1_038_iiyiyukimish	teepee
1_039_uschikimikw	new dwellings
1_040_nisikus	my mother-in-law
1_041_waau	egg
1_042_maaskiniu	trails
1_043_waat	beaver/muskrat tunnel
1_044_kishkichaau	the (wooden) boxes are square
1_045_iitaamiskimikw	the basement

1_046_mitihchii	hand
1_047_maaskiniu	trail
1_048_waat	beaver/muskrat tunnels
1_049_chiipiikimikw	graveyard
1_050_shuwiyaaniwit	wallets
1_051_piisimuhkaan	clocks
1_052_akhup	coat
1_053_misinihiikinaachiniwit	cardboard box
1_054_paashchishikinish	small guns
1_055_muuhkumaan	knives
1_056_chiskutimaatuukimikw	schools
1_057_mihtihkaan	wood piles
1_058_apis	string
1_059_kilwaakis	burlap material
1_060_astaasuukimikw	warehouses
1_061_wiikhwaayaaukuhp	parka – lit. 'like a bag'
1_062_iiyimiichiwaahp	teepee
1_063_piisimuhkaan	clock
1_064_usisim	his/her grandchild(ren)
1_066_chimuwinikuhp	rain coats
1_067_nihkumis	my uncle
1_068_piishaakinikuhp	hide/leather coats
1_069_miinaahtikw	berry bush
1_070_uniwii	his/her cheek
1_071_piishaakinikuhp	hide/leather coat
1_072_iischiimaauschii	Inuit territory
1_073_mitaas	socks
1_074_shuwiyaanikimikw	banks
1_075_niichishaan	my sibling
1_076_miyiu	dead bodies
1_077_wichii	mountains
1_078_mitutisaan	sweat lodge
1_079_akhup	coats
1_081_iischiimaauschii	Inuit territories
1_082_kaawaastaanikihchichaapiyich	flashlight
1_083_mishkushiu	grass/vegetables/hay
1_084_utyiyim	his/her people
1_085_uschisk	John sees the pine tree.
1_087_miinish	berry
1_088_uhkum	his/her grandmother
1_089_nuuhkum	my grandmother
1_091_chiimaan	boats/large ships
1_092_nitiwaashishiim	my child
1_094_shuwiyaaniwit	wallet
1_095_nitaanishkutaapaam	my great-great-grandmother/father
1_096_wiich	his/its home/dwelling
1_097_miinaapuu	The berries are juicy.

1_098_aamiukihp	spawning place
1_100_wiihkwaayaaukuhp	parkas
1_101_mitihchii	hands
1_102_shikutaau	bakeapples
1_103_paashtaaumiichimh	dried meats
1_104_chishaayaakwaapit	bear tooth
1_106_chuuchuu	baby bottle
1_107_mitaas	sock
1_108_uskutimh	dams/beaver dams
1_109_nitaanis	my daughter
1_110_shiipaachipiyuwikuhp	sweaters
1_111_shiipaachipiyuwikuhp	sweater
1_113_mishtikuwit	coffins
1_114_mishchikush	small sticks
1_115_utaanis	her/his daughter
1_116_chisihiiikinaahtikw	broom
1_117_miinish	berries
1_118_umushumh	his/her grandfather
1_119_panikiik	John sees the pancake.
1_121_nitaaniskutaapaam	his/her great-great-grandmother/father –
1_122_nimihtinikaat	its left legs
1_123_nipaaukimikw	bedroom, hotel
1_125_uschihtaasiu	pond lily
1_126_nisisim	my grandchild
1_127_piihtiwipichiwiyaan	undershirt
1_128_utiwaashishiim	his/her child(ren)
1_129_nimihtinikaat	its left leg
1_131_mishtikw	sticks
1_132_chiipiikimikw	graveyards
1_133_upishtaahuyuu	his/her/its (anim) diaphragm
1_134_iiyiyukimikush	teepees – dwelling for humans (lit)
1_135_usikus	her/his mother-in-law
1_136_aatiyuuhkaan	legends
1_137_uchaapaanish	cars
1_138_siipii	rivers
1_139_wiichishaan	her/his sibling
1_140_aschii	worlds/countries/lands/territories
1_141_niwiichiyyiyiu	my sibling
1_142_paashchishikinish	small gun
1_143_miichim	foods
1_144_wiyaas	meat
1_145_miichisuukimikw	restaurant
1_147_mitaas	her/his son
1_148_mihtiwikii	ear
1_149_uut	canoes
1_150_utimiskumaau	beaver trail
1_151_mitaas	socks

1_152_pipunikaan	winter dwellings
1_153_uchischiwaahiichaa	prophet
1_154_wiich	his/its home/dwellings
1_155_uwaatinikuhp	wedding dresses
1_156_miiwit	suitcases
1_157_chishaayaakwaapit	bear teeth
1_158_waau	eggs
1_159_apis	string
1_160_upishtaahuyuu	my diaphragm
1_162_nitaanishkiwishiim	my great grandmother/father
1_163_muushtaa	forest fires
1_164_wichii	mountain
1_165_utaanishkiwishiim	his/her great grandmother(s)/father(s)
1_166_mishtikw	stick
1_167_uskaataayaapii	plant root/stem
1_168_uchishkwaachihchiish	his/her baby finger
1_169_niimaawiniwit	lunch bag
1_170_miichisuukimikw	restaurants
1_171_nipaaukimikw	bedrooms, hotels
1_172_chimuwinikuhp	rain coat
1_173_uskutim	dam/beaver dam
1_174_nichishkaatuu	Things meet.
1_175_chisihiikinaahtikw	brooms
1_176_wiyyisht	its foot
1_177_uniwii	his/her cheeks
1_178_astaasuukimikw	warehouse
1_180_siipii	river
1_181_piskustihchaau	it is a rise (large bump on the land).
1_182_saakihiikinipaakush	small ponds
1_183_uskaataayaapii	stems
1_184_miinaahtikw	berry bushes
1_185_shuwiyaanikimikw	bank
1_187_shikutaau	bakeapple
1_188_chiimaan	boat/large ship
1_189_miyiu	dead body
1_190_aaniskiwikinitihchaan	finger joint
1_191_iiyimiichiwaahp	teepees
1_192_aschii	world/country/land/territory
1_193_mishtikuwit	coffin
1_194_kaanichii	sweater
1_195_nimushum	my grandfather
1_196_chiskutimaatuukimikw	school
1_197_mishchikush	small stick
1_198_mishkushiu	blade of grass/ vegetable/ hay
1_199_wiitimush	his sister-in-law
1_200_nisk-h	John sees the goose.
1_201_utimiskumaau	beaver trails

1_202_uchischiwaahiichaau	his prophet
1_204_kuskusch	cross-bars on snowshoes
1_205_piihtiwipichiwiyaanaan	undershirts
1_206_iyik	John sees the frog.
1_207_mitutisaanh	sweat lodges
1_208_kishkichaau_mishtikuwit	The (wooden) box is square.
1_209_kaawaastaanikihchichaapiyich	flashlights
1_210_aatiyuuhkaan	legend
1_211_saakihiikinipaakush	small pond
1_212_uchishkwaachihchiish	his/her baby fingers
1_213_uschihtaasiu	pond lily
1_214_uskaataayaapii	stem
1_215_chuuchuu	baby bottles
2_001_muusuyaas	moose meat
2_002_piiskustihchaau	It is a rise (large bump on the land).
2_003_nitiyim	my person/my child
2_004_uut	canoe
2_005_mitukihp	deserted camps – changed spelling
2_006_niimaawiniwit	lunch bags
2_007_misinihiikinaachiniwit	cardboard/paper boxes
2_009_aaniskiwikinitihchaan	finger joints
2_010_uhkumis	her/his uncle
2_011_muuhkumaanish	pocket knife
2_012_pipunikaan	winter dwelling
2_013_miinaapuu	The berry is juicy.
2_014_muushtaa	forest fire
2_015_kaanichii	sweaters
2_016_uchaapaanish	car
2_018_muusuyaas	moose meat
2_019_miichim	food
2_020_kuskusch	cross-bar on snowshoes
2_021_uwaatinikuhp	wedding dress
2_022_aamiukihp	spawning places
2_023_mitukihp	deserted camp
2_024_miiwit	suitcase
2_026_chaachishaapaayaakuhp	house coat
2_027_muuhkumaanish	pocket knives
2_028_wiisht	its feet
2_029_maschisk	John sees the cedar tree.
2_030_muuhkumaan	knife
2_031_mihtihkaan	wood pile
2_032_mihtiwikii	ears
2_033_niwiitimus	my sister/brother-in-law
2_034_uschikimikw	new dwelling
2_035_paashtaumiichim	dried meat
2_036_chaachishaapaayaaukuhp	house coats
2_037_wiyaas	meat

2_038_iiyiyukimikw	teepee
2_039_uschikimikw	new dwellings
2_040_nisikus	my mother-in-law
2_041_waau	egg
2_042_maaskiniu	trails
2_043_waat	beaver/muskrat tunnel
2_044_kishkichaau	The (wooden) boxes are square.
2_045_iitaamiskimikw	the basement
2_046_mitihchii	hand
2_047_maaskiniu	trail
2_048_waat	beaver/muskrat tunnels
2_049_chiipiikimikw	graveyard
2_050_Shuiyaaniwit	wallets
2_051_piisimuhkaanich	clocks-
2_052_akuhp	coat
2_053_misinihiikinaachiniwit	cardboard box
2_054_paashchishikinish	small guns
2_055_muuhkumaan	knives
2_056_Chiskutimaatuukimikw	schools
2_057_mihtihkaan	wood piles
2_058_apis	string
2_059_kilwaakis	burlap materials
2_060_astaasuukimikw	warehouses
2_061_wiikhwaayaaukuhp	parka – lit. 'like a bag'
2_062_iiyimiichiwaahp	teepee
2_063_piisimihkaan	clock
2_064_usisim	his/her grandchild(ren)
2_066_chimuwiniukuhp	rain coats
2_067_nihkumis	my uncle
2_068_piishaakinikuhp	hide/leather coats
2_069_miinaahtikw	berry bush
2_070_uniwii	his/her cheek
2_071_piishaakinikuhp	hide/leather coat
2_072_iischiimaauschii	Inuit territory
2_073_mitaas	socks
2_074_shuwuyaanimikw	banks
2_075_niichishaan	my sibling
2_076_miyiu	dead bodies
2_077_wichii	mountains
2_078_mitutisaan	sweat lodge
2_079_akhup	coats
2_080_kilwaakis	burlap materials
2_081_iischiimaauschii	Inuit territories
2_082_kaawaastaanikihchichaapiyich	flashlight
2_083_mishkushiu	grass/vegetables/hay
2_084_utyiyim	his/her people
2_085_uschisk	John sees the pine tree.

2_087_miinish	berry
2_088_uhkum	his/her grandmother
2_089_nuuhkum	my grandmother
2_091_chiimaan	boats/large ships
2_092_nitiwaashishiim	my child
2_094_shuwiyaaniwit	purse/wallet
2_095_nitaaniskutaapaam	my great-great-grandmother/father
2_096_wiich	his/its home/dwelling
2_097_miinaapuu	The berries are juicy.
2_098_aamiukihp	spawning place
2_100_wiikhwaayaaukuhp	parkas
2_101_mitihchii	hands
2_102_shikutaau	bakeapples
2_103_paashtaaumiichim	dried meats
2_104_chishaayaakwaapit	bear tooth
2_106_chuuchuu	baby bottle
2_107_mitaas	sock
2_108_uskutim	dams/beaver dams
2_109_nitaanis	my daughter
2_110_shiipaachipiyuwikuhp	sweaters
2_111_shiipaachipiyuwikuhp	sweater
2_113_mishtikuwit	coffins
2_114_mishchikush	small sticks
2_115_utaanis	her/his daughter
2_116_chisihiikinaahtikw	broom
2_117_miinish	berries
2_118_umushum	his/her grandfather
2_119_panikik	John sees the pancake.
2_121_utaanishkiwishiimh	his/her great-great-grandmother/father
2_122_nimihtinikaat	its left legs
2_123_nipaaukimikw	bedroom, hotel
2_124_wiichiyyiyiu	his/her sibling
2_125_uschihtaasiu	pond lily
2_126_nisisim	my grandchild
2_127_piihtuwupichiwiyaan	undershirt
2_128_utiwaashishiim	his/her child(ren)
2_129_nimihtinikaat	its left leg
2_131_mishtikw	sticks
2_132_chiipiikimikw	graveyards
2_133_upishtaahuyuu	his/her/its (anim) diaphragm
2_134_iiyiyukimikush	teepees – dwelling for humans (lit)
2_135_usikus	her/his mother-in-law
2_136_aatiyuuhkaan	legends
2_137_uchaapaanish	cars
2_138_siipii	rivers
2_139_wiichishaan	her/his sibling
2_140_aschii	worlds/countries/lands/territories

2_141_niwiichiiyiyiu	my sibling
2_142_paashchishikinish	small gun
2_143_miichim	foods
2_144_wiyaas	meat
2_145_miichisuukimikw	restaurant
2_147_mitaas	socks
2_149_uut	canoes
2_151_mitaas	sock
2_154_wiich-h	his/its home/dwellings
2_155_uwaatinikuhp	wedding dresses
2_156_miiwit-h	suitcases
2_157_chishaayaakwaapit	bear teeth
2_159_apis	string
2_162_nitaanishkiwishiim	my great grandmother/father
2_165_utaanishkiwishiim	his/her great grandmother(s)/father(s)
2_166_mishtikw	stick
2_168_uschishkwaachihchiish	his/her baby finger
2_169_niimaawiniwit	lunch bag
2_170_miichisuukimikw	restaurants
2_171_nipaaukinikw	bedrooms, hotels
2_172_chimuwinikuhp	rain coat
2_173_uskutim	dam/beaver dam
2_175_chisihiikinaahtikw	brooms
2_176_wiyyisht-h	its foot
2_178_astaasuukinikw	warehouse
2_180_siipii	river
2_181_piskustihchaau	It is a rise (large bump on the land).
2_182_saakihiikinipaaskush	small ponds
2_183_uskaataayaapii-h	stems
2_184_miinaahtikw	berry bushes
2_185_shuwiyaanikinikw	bank
2_187_shikutaau	bakeapple
2_188_chiimaanh	boat/large ship
2_189_miyiu	dead body
2_190_aaniskiwikinitihchaan	finger joint
2_191_iiyimiichiiwaahp	teepees
2_192_aschii	world/country/land/territory
2_193_mishtikuwit	coffin
2_194_kaanichii	sweater
2_195_nimushum	my grandfather
2_196_chiskutimaatuukimikw	school
2_197_mishchikush	small stick
2_198_mishkushiu	blade of grass/ vegetable/ hay
2_199_wiitimus-h	his sister-in-law
2_200_nisk-h	John sees the goose.
2_201_utimiskumaau	beaver trails
2_202_uchuschiwaahiichaau	his prophet

2_203_nichishkaatuu	It meets.
2_204_kuskusch	cross-bars on snowshoes
2_205_piihtiwipichiwiyaanaan	undershirts
2_206_iyik-h	John sees the frog.
2_207_mitutisaan	sweat lodges
2_208_mishtikuwit	The (wooden) box is square.
2_209_kaawaastaanikihchichaapiyich	flashlights
2_210_aatiyuuhkaan	legend
2_211_saakihiikinipaakush	small pond
2_212_uchishkwaachihchiish	his/her baby fingers
2_213_uschihtaasiu	pond lily
2_214_uskaataayaapii	stem
2_215_chuuchuu	baby bottles

(2) JN

3_003_nitiyim	my person/my child
3_004_uut	canoe
3_005_mitukuhp	deserted camps
3_006_niimaawiniwit	lunch bags
3_007_misinihiikinaachiniwit	cardboard/paper boxes
3_009_aaniskiwikinitihchaan	finger joints
3_010_uhkumis	her/his uncle
3_011_muuhkumaanish	pocket knife
3_013_miinaapuu	The berry is juicy.
3_014_muushtaa	forest fire
3_015_kaanichii	sweaters
3_016_uchaapaanish	car
3_018_muusuyaas	moose meat
3_019_miichim	food
3_020_kuskusch	cross-bar on snowshoes
3_021_uwaatinikuhp	wedding dress
3_023_mitukihp	deserted camp
3_024_miiwit	suitcase
3_025_uskaataayaapii	plant roots/stems – lit. leg strings
3_026_chaachishaapaayaaukuhp	house coat
3_027_muuhkumaanish	pocket knives
3_028_wiisist	its feet – never heard this
3_029_maschisk	John sees the cedar tree.
3_031_mihtihkaan	wood pile
3_032_mihtiwikii	ears
3_033_niwiitimus	my sister/brother-in-law
3_034_uschikimikw	new dwelling
3_035_paashtaaumiichim	dried meat
3_036_chaachishaapaauaaukuhp	house coats
3_038_iiyiyukimikw	teepee
3_039_uschikimikw	new dwellings

3_040_nisikus	my mother-in-law
3_041_waau	egg
3_042_maaskiniu	trails
3_043_waat	beaver/muskrat tunnel
3_045_iitaamiskimikw	the basement
3_046_mitihchii	hand
3_047_maaskiniu	trail
3_048_waat	beaver/muskrat tunnels
3_049_chiipiikimikw	graveyard
3_050_shuwiyaaniwit	wallets
3_051_piisimuhkaanich	clocks
3_052_akhup	coat
3_053_misinikiikinaachiniwit	cardboard box
3_054_paashchishikinish	small guns
3_055_muuhkumaan	knives
3_056_chiskutimaatuukimikw	schools
3_057_mihtihkaan	wood piles
3_061_wiikhwaayaaukuhp	parka
3_062_iiyimiichiwaahp	teepee
3_063_piisimihkaan	clock
3_066_chimuwinikuhp	rain coats
3_067_nihkumis	my uncle
3_068_piishaakinikuhp	hide/leather coats
3_069_miinaahtikw	berry bush
3_070_uniwii	his/her cheek
3_071_piishaakinikuhp	hide/leather coat
3_072_iischiimaauschii	Inuit territory
3_073_mitaas	socks
3_074_shuwuyaaniikimikw	banks
3_075_niichishaan	my sibling
3_076_miyiu	dead bodies
3_077_wichii	mountains
3_078_mitutisaan	sweat lodge
3_079_akhup	coats
3_081_iischiimaauschii	Inuit territories
3_082_kaawaastaanikihchichaapiyich	flashlight
3_083_mishkushiu	grass/vegetables/hay
3_084_utiyyim	his/her people
3_085_uschisk	John sees the pine tree.
3_087_miinish	berry
3_088_uhkum	his/her grandmother
3_089_nuuhkum	my grandmother
3_091_chiimaan	boats/large ships
3_092_nitiwaashishiim	my child
3_094_shuwiyaaniwit	wallet
3_095_nitaaniskutaapaam	my great-great-grandmother/father
3_096_wiich	his/its home/dwelling

3_097_miinaapuu	The berries are juicy.
3_100_wiikhwaayaaukuhp	parkas
3_101_mitihchii	hands
3_102_shikutaau	bakeapples
3_103_paashtaaumiichim	dried meats
3_104_chishaayaakwaapit	bear tooth
3_107_mitaas	I see the cedar tree.
3_108_uskutim	dams/beaver dams
3_109_nitaanis	my daughter
3_110_shiipaachipiyuwikuhp	sweaters
3_111_shiipaachipiyuwikuhp	sweater
3_113_mishtikuwit	streams/creeks
3_114_mishchikush	small sticks
3_115_utaanis	her/his daughter
3_118_umushum	his/her grandfather
3_119_panikik	John sees the pancake.
3_123_nipaaukimikw	my child
3_124_wiichiyyiu	her/his sibling
3_125_uschihtaasiu	pond lily
3_127_piihtuwupichiwiyaan	undershirt
3_128_utiwaashishiim	his/her child(ren)
3_129_nimihtinikaat	its left leg
3_131_mishtikw	sticks
3_132_chiipiikimikw	graveyards
3_134_iyyiukimikush	teepees – dwelling for humans (lit)
3_135_usikus	her/his mother-in-law
3_136_aatiyuuhkaan	legends
3_137_uchaapaanish	cars
3_138_siipii	rivers
3_139_wiichishaan	her/his sibling
3_140_aschii	worlds/countries/lands/territories
3_141_niwiichiyyiu	my sibling
3_142_paashchishikinish	small gun
3_143_miichim	foods
3_144_wiyaas	meat
3_145_miichisuukimikw	restaurant
3_148_mihtiwikii	ear
3_149_uut	canoes
3_150_vowel	beaver trail
3_151_mitaas	socks
3_153_uchischiwaahiichaau	prophet
3_155_uwaatinikuhp	wedding dresses
3_156_miiwit-h	suitcases
3_157_chishaayaakwaapit	bear teeth
3_158_waau	eggs
3_159_apis	string
3_162_nitaanishkiwishiim	my great grandmother/father

3_163_muushtaa	forest fires
3_164_wichii	mountain
3_165_utaanishkiwishiim	his/her great grandmother(s)/father(s)
3_166_mishtikw	stick
3_167_uskaataayaapii	plant root/stem
3_168_uschishkwaachihchiish	his/her baby finger
3_169_niimaawiniwit	lunch bag
3_170_miichisuukimikw	restaurants
3_171_nipaauginikw	bedrooms, hotels
3_172_chimuwinikuhp	rain coat
3_173_uskutim	dam/beaver dam
3_174_nichishkaatuu	Things meet.
3_176_wiyyisht	its foot
3_177_uniwii	his/her cheeks
3_180_siipii	river
3_181_piskustihchaau	It is a rise (large bump on the land).
3_182_saakihiikinipaaskush	small ponds
3_183_uskaataayaapii	stems
3_184_miinaahtikw	berry bushes
3_185_shuwiyaanikinikw	bank
3_187_shikutaau	bakeapple
3_188_chiimaan	boat/large ship
3_189_miyiu	dead body
3_190_aaniskiwikinitihchaan	finger joint
3_192_aschii	world/country/land/territory
3_193_mishtikuwit	coffin
3_194_kaanichii	sweater
3_195_nimushum	my grandfather
3_196_chiskutimaatuukimikw	school
3_197_mishchikush	small stick
3_198_mishkushiu	blade of grass/ vegetable/ hay
3_199_wiitimus	his sister-in-law
3_200_nisk	John sees the goose.
3_201_vowel	beaver trails
3_202_uchuschiwaahiichaau	his prophet
3_204_kuskusch	It meets.
3_205_piihtiwipichiwiyaanaan	undershirts
3_206_iyik	John sees the frog.
3_207_mitutisaan	sweat lodges
3_208_mishtikuwit	The (wooden) box is square.
3_209_kaawaastaanikihchichaapiyich	flashlights
3_210_aatiyuuhkaan	legend
3_211_saakihiikinipaakush	small pond
3_212_uchishkwaachihchiish	his/her baby fingers
3_214_uskaataayaapii	stem

(3) MN

5_003_nitiyim	my person/my child
5_004_uut	canoe
5_005_mitukihp	deserted camps
5_006_niimaawiniwit	lunch bags
5_007_misinihiikinaachiniwit	cardboard/paper boxes
5_010_uhkumis	her/his uncle
5_011_muuhkumaanish	pocket knife
5_012_pipunikaan	winter dwelling
5_013_miinaapuu	The berry is juicy.
5_014_muushtaa	forest fire
5_015_kaanichii	sweaters
5_016_uchaapaanish	car
5_018_muusuyaas	moose meat
5_019_miichim	food
5_021_uwaatinikuhp	wedding dress
5_023_mitukihp	deserted camp
5_024_miiwit	suitcase
5_025_uskaataayaapii	plant roots/stems – lit. leg strings
5_026_chaashishaapaayaakuhp	house coat
5_027_muuhkumaanish	pocket knives
5_029_maschisk	John sees the cedar tree.
5_030_muuhkumaanish	knife
5_031_mihtihkaan	wood pile
5_032_mihtiwikii	ears
5_033_niwiitimus	my sister/brother-in-law
5_034_uschikimikw	new dwelling
5_035_paashtaaumiichim	dried meat
5_036_chaachishaapaayaaukuhp	house coats
5_038_iiyiyukimikw	teepee
5_039_uschikimikw	new dwellings
5_040_nisikus	my mother-in-law
5_041_waau	egg
5_042_maaskiniu	trails
5_043_waat	beaver/muskrat tunnel
5_044_kishkichaau	The (wooden) boxes are square.
5_045_iitaamiskimikw	the basement
5_046_mitihchii	hand
5_047_maaskiniu	trail
5_049_chiipiikimikw	graveyard
5_050_shuwiyaaniwit	wallets
5_051_piisimuhkaanich	clocks
5_052_akuhp	coat
5_053_misinihiikinaachiniwit	cardboard box
5_054_paashchikinish	small guns
5_055_muuhkumaan	knives
5_056_chiskutimaatuukimikw	schools

5_057_mihtihkaan	wood piles
5_060_astaasuukimikw	warehouses
5_061_wiikhwaayaaukhp	parka – lit. 'like a bag'
5_062_iiyimiichiwaahp	teepee
5_063_piisimihkaan	clock
5_064_usisim	his/her grandchild(ren)
5_066_chimuwinikuhp	rain coats
5_067_nihkumis	my uncle
5_068_piishaakinikuhp	hide/leather coats
5_069_miinaahtikw	berry bush
5_070_uniwii	his/her cheek
5_071_piishaakinikuhp	hide/leather coat
5_072_iischiimaauschii	Inuit territory
5_073_mitaas	socks
5_074_shuwuyaanimikw-h	banks
5_075_niichishaan	my sibling
5_078_mitutisaan	sweat lodge
5_079_akhup	coats
5_081_iischiimaauschii	Inuit territories
5_082_kaawaastaanikihchichaapiyich	flashlight
5_083_mishkushiu	grass/vegetables/hay
5_084_utyiyim	his/her people
5_085_uschisk	John sees the pine tree.
5_086_uut	the other canoes broke
5_087_miinish	berry
5_088_uhkum	his/her grandmother
5_089_nuuhkum	my grandmother
5_091_chiimaan	boats/large ships
5_092_nitiwaashishiim	my child
5_094_shuwiyaaniwit	wallet
5_095_nitaaniskutaapaam	my great-great-grandmother/father
5_096_wiich	his/its home/dwelling
5_097_miinaapuu	The berries are juicy.
5_100_wiikhwaayaaukuhp	parkas
5_101_mitihchii	hands
5_102_shikutaau	bakeapples
5_103_paashtaaumiichim	dried meats
5_104_chishaayaakwaapit	bear tooth
5_107_mitaas	sock
5_108_uskutim	dams/beaver dams
5_109_nitaanis	my daughter
5_113_mishtikuwit	coffins
5_114_mishchikush	small sticks
5_115_utaanis	her/his daughter
5_117_miinish	berries
5_118_umushum	his/her grandfather
5_119_panikik	John sees the pancake.

5_123_nipaaukimikw	bedroom, hotel
5_124_wiichiyyiu	her/his sibling
5_126_nisisim	my grandchild
5_127_piihtuwupichiwiyaanaan	undershirt
5_128_utiwaashishiim	his/her child(ren)
5_129_nimihtinikaat	its left leg
5_131_mishtikw	sticks
5_132_chiipiikimikw	graveyards
5_134_iyyiukimikush	teepees – dwelling for humans (lit)
5_135_usikus	her/his mother-in-law
5_136_aatiyuuhkaan	legends
5_137_uchaapaanish	cars
5_138_siipii	rivers
5_139_wiichishaan	her/his sibling
5_140_aschii	worlds/countries/lands/territories
5_141_niwiichiyyiu	my sibling
5_142_paashchishikinish	small gun
5_143_miichim	foods
5_144_wiyaas	meat
5_145_miichisuukimikw	restaurant
5_148_mihtiwikii	ear
5_149_uut	canoes
5_152_pipunikaan	winter dwellings
5_154_wiich	his/its home/dwellings
5_155_uwaatinikuhp	wedding dresses
5_156_miiwit	suitcases
5_157_chishaayaakwaapit	bear teeth
5_158_waau	eggs
5_162_nitaanishkiwishiim	my great grandmother/father
5_163_muushtaa	forest fires
5_164_wichii	mountain
5_165_utaanishkiwishiim	his/her great grandmother(s)/father(s)
5_166_mishtikw	stick
5_167_uskaataayaapii	plant root/stem
5_168_uschishkwaachihchiish	his/her baby finger
5_169_niimaawiniwit	lunch bag
5_170_miichisuukimikw	restaurants
5_171_nipaaukinikw	bedrooms, hotels
5_172_chimuwinikuhp	rain coat
5_173_uskutim	dam/beaver dam
5_174_nichishkaatuu	Things meet.
5_177_uniwii	his/her cheeks
5_178_astaasuukinikw	warehouse
5_179_pipaayihtaamuu	They are or are stuck here and there.
5_180_siipii	river
5_182_saakihiikinipaaskush	small ponds
5_183_uskaataayaapii	stems

5_184_miinahtikw	berry bushes
5_185_shuwiyaanikinikw	bank
5_187_shikutaau	bakeapple
5_188_chiimaan	boat/large ship
5_189_miyiu	dead body
5_191_iiyimiichiwaahp	teepees
5_192_aschii	world/country/land/territory
5_193_mishtikuwit	coffin
5_194_kaanichii	sweater
5_195_nimushum	my grandfather
5_196_chiskutimaatuukinikw	school
5_197_mishchikush	small stick
5_198_mishkushiu	blade of grass/ vegetable/ hay
5_199_wiitimus	his sister-in-law
5_200_nisk	John sees the goose
5_201_utimiskumaau	beaver trails
5_205_piihtiwipichiwiyaanaan	undershirts
5_206_iyik	John sees the frog.
5_207_mitutisaan	sweat lodges
5_208_mishtikuwit	The (wooden) box is square.
5_209_kaawaastaanikihchichaapiyich	flashlights
5_210_aatiyuuhkaan	legend
5_211_saakihiikinipaakush	small pond
5_212_uchishkwaachihchiish	his/her baby fingers
5_214_uskaataayaapii	stem
5_48_waat	beaver/muskrat tunnels
6_003_nitiyim	my person/my child
6_004_uut	canoe
6_005_mitukihp	deserted camps
6_006_niimaawiniwit	lunch bags
6_007_misinihiikinaachiniwit	cardboard/paper boxes
6_010_uhkumis	her/his uncle
6_011_muuhkumaanish	pocket knife
6_012_pipunikaan	winter dwelling
6_013_miinaapuu	The berry is juicy.
6_014_muushtaau	forest fire
6_015_kaanichii	sweaters
6_016_uchaapaanish	car
6_018_muusuyaas	moose meat
6_019_miichim	food
6_021_uwaainikuhp	wedding dress
6_023_mitukihp	deserted camp
6_024_miiwit	suitcase
6_025_uskaataayaapii	plant roots/stems – lit. leg strings
6_026_chaashishaapaayaakuhp	house coat
6_027_muuhkamaanish	pocket knives
6_029_maschisk	John sees the cedar tree.

6_030_muuhkumaanish	knife
6_031_mihtihkaan	wood pile
6_032_mihtiwikii	ears
6_033_niwiitimus	my sister/brother-in-law
6_034_uschikimikw	new dwelling
6_035_paashtaaumiichim	dried meat
6_036_chachishaapaayaaukuhp	house coats
6_038_iiyiyukimikw	teepee
6_039_uschikimikw	new dwellings
6_040_nisikus	my mother-in-law
6_041_waau	egg
6_042_maaskiniu	trails
6_043_waat	beaver/muskrat tunnel
6_044_kishkichaau	The (wooden) boxes are square.
6_045_iitaamiskimikw	the basement
6_046_mitihchii	hand
6_047_maaskiniu	trail
6_048_waat	beaver/muskrat tunnels
6_049_chiipiikimikw	graveyard
6_050_shuwiyaaniwit	wallets
6_051_piisimuhkaanich	clocks
6_052_akuhp	coat
6_053_misinihiikinaachiniwit	cardboard box
6_054_paashchikinish	small guns
6_055_muuhkumaan	knives
6_056_chiskutimaatuukimikw	schools
6_057_mihtihkaan	wood piles
6_060_astaasuukimikw	warehouses
6_061_wiikhwaayaaukuhp	parka – lit. 'like a bag'
6_062_iiyimiichiwaahp	teepee
6_063_piisimiuhkaan	clock
6_064_usisim	his/her grandchild(ren)
6_065_uut	canoe
6_066_chimuwinikuhp	rain coats
6_067_nihkumis	my uncle
6_068_piishaakinikuhp	hide/leather coats
6_069_miinaahtikw	berry bush
6_070_uniwii	his/her cheek
6_071_piishaakinikuhp	hide/leather coat
6_072_iischiimaauschii	Inuit territory
6_073_mitaas	socks
6_074_shuwuyaanimikw	banks
6_075_nichishaan	my sibling
6_078_mitutisaan	sweat lodge
6_079_akhup	coats
6_081_iischiimaauschii	Inuit territories
6_082_kaawaastaanikihchichaapiyich	flashlight

6_083_mishkushiu	grass/vegetables/hay
6_084_utiyyim	his/her people
6_085_uschisk	John sees the pine tree.
6_086_uut	the other canoes broke
6_087_miinish	berry
6_088_uhkum	his/her grandmother
6_089_nuuhkum	my grandmother
6_091_chiimaan	boats/large ships
6_092_nitiwaashishiim	my child
6_094_shuwiyaaniwit	wallet
6_095_nitaaniskutaapaam	my great-great-grandmother/father
6_096_wiich	his/its home/dwelling
6_097_miinaapuu	The berries are juicy.
6_100_wiikhwaayaaukuhp	parkas
6_101_mitihchii	hands
6_102_shikutaau	bakeapples
6_103_paashtaaumiichim	dried meats
6_104_chishaayaakwaapit	bear tooth
6_107_mitaas	sock
6_108_uskutim	dams/beaver dams
6_109_nitaanis	my daughter
6_113_chiipiimishtikuwit	coffins
6_114_mishchikush	small sticks
6_115_utaanis	her/his daughter
6_117_miinish	berries
6_118_umushum	his/her grandfather
6_119_panikik	John sees the pancake.
6_123_nipaaukimikw	bedroom, hotel
6_124_wiichiyyiyiu	her/his sibling
6_126_nisisim	my grandchild
6_127_piihtuwupichiwiyaanaan	undershirt
6_128_utiwaashishiim	his/her child(ren)
6_129_nimihtinikaat	its left leg
6_131_mishtikw	sticks
6_132_chiipiikimikw	graveyards
6_134_iyyiyukimikush	teepees – dwelling for humans (lit)
6_135_usikus	her/his mother-in-law
6_136_aatiyuuhkaan	legends
6_137_uchaapaanish	cars
6_138_siipii	rivers
6_139_wiichishaan	her/his sibling
6_140_aschii	worlds/countries/lands/territories
6_141_niwiichiyyiyiu	my sibling
6_142_paashchishikinish	small gun
6_143_miichim	foods
6_144_wiyaas	meat
6_145_miichisuukimikw	restaurant

6_148_mihtiwikii	ear
6_149_uut	canoes
6_152_pipunikaan	winter dwellings
6_154_wiich	his/its home/dwellings
6_155_uwaatinikuhp	wedding dresses
6_156_miiwit	suitcases
6_157_chishaayaakwaapit	bear teeth
6_158_waau	eggs
6_162_nitaanishkiwishiim	my great grandmother/father
6_163_muushtaa	forest fires
6_164_wichii	mountain
6_165_utaanishkiwishiim	his/her great grandmother(s)/father(s)
6_166_mishtikw	stick
6_167_uskaataayaapii	plant root/stem
6_168_uschishkwaachihchiish	his/her baby finger
6_169_niimaawiniwit	lunch bag
6_170_miichisuukimikw	restaurants
6_171_nipaaukinikw	bedrooms, hotels
6_172_chimuwinikuhp	rain coat
6_173_uskutim	dam/beaver dam
6_174_nichishkaatuu	Things meet.
6_177_uniwii	his/her cheeks
6_178_astaasuukinikw	warehouse
6_179_pipaayihtaamuu	They are or are stuck here and there.
6_180_siipii	river
6_182_saakihiikinipaaskush	small ponds
6_183_uskaataayaapii	stems
6_184_miinahtikw	berry bushes
6_185_shuwiyaanikinikw	bank
6_187_shikutaau	bakeapple
6_188_chiimaan	boat/large ship
6_189_miyiu	dead body
6_191_iiyimiichiwaahp	teepees
6_192_aschii	world/country/land/territory
6_193_chiipiimishtikuwit	coffin
6_194_kaanichii	sweater
6_195_nimushum	my grandfather
6_196_chiskutimaatuukinikw	school
6_197_mishchikush	small stick
6_198_mishkushiu	blade of grass/ vegetable/ hay
6_199_wiitimus	his sister-in-law
6_200_nisk	John sees the goose
6_201_utimiskumaau	beaver trails
6_205_piihtiwipichiwiyaanaan	undershirts
6_206_iyik	John sees the frog.
6_207_mitutisaan	sweat lodges
6_208_mishtikuwit	The (wooden) box is square.

6_209_kaawaastaanikihchichaapiyich	flashlights
6_210_aatiyuuhkaan	legend
6_211_saakihii kinipaakush	small pond
6_214_uskaataayaapii	stem

Appendix IV: Praat Script Grid-Maker

```
# This script goes through sound and TextGrid files in a directory,

# opens each pair of Sound and TextGrid, calculates the pitch maximum
# of each labeled interval, and saves results to a text file.
# To make some other or additional analyses, you can modify the script
# yourself... it should be reasonably well commented! ;)
#
# This script is distributed under the GNU General Public License.
# [adapted from] Copyright 4.7.2003 Mietta Lennes

form Analyze pitch maxima from labeled segments in files
  comment Directory of sound files
  text sound_directory /Users/Lana/Dropbox/THESIS RELATED/Marg Henry
Story (with chunks)/Marge Henry, July 4, 2005 copy/MHSCunks (Phase 2 in
progress)/Folder1/
  sentence Sound_file_extension .aif
  comment Directory of TextGrid files
  text textGrid_directory /Users/Lana/Dropbox/THESIS RELATED/Marg
Henry Story (with chunks)/Marge Henry, July 4, 2005 copy/MHSCunks
(Phase 2 in progress)/Folder1/
  sentence TextGrid_file_extension .TextGrid
  comment Full path of the resulting text file:
  text resultfile /Users/Lana/Dropbox/THESIS RELATED/Marg Henry Story
(with chunks)/Marge Henry, July 4, 2005 copy/MHSCunks (Phase 2 in
progress)/Folder1/pitch-results.txt
  comment Which tier do you want to analyze?
  sentence Tier Vowels
  comment Pitch analysis parameters
  positive Time_step 0.01
  positive Minimum_pitch_(Hz) 75
  positive Maximum_pitch_(Hz) 300
endform

# Here, you make a listing of all the sound files in a directory.
# The example gets file names ending with ".aif" from
C:\Users\Sarah\Desktop\Lana-textgrids\

Create Strings as file list... list
'sound_directory$'*'sound_file_extension$'
```

```

numberOfFiles = Get number of strings

# Check if the result file (e.g., results-pitch.txt) exists. If it does,
ask if you would like to overwrite the file.
if fileReadable (resultfile$)
    pause The result file 'resultfile$' already exists! Do you want to
    overwrite it?
    filedelete 'resultfile$'
endif

# Write a title row with column titles to the result file:
# (remember to edit this if you add or change the analyses!)

titleline$ = "Filename Segment label Start (ms) End (ms) Duration
(ms) Minimum pitch (Hz) Min pitch time (ms) Maximum pitch (Hz) Max
pitch time (ms) Average pitch 'newline$'"
fileappend "'resultfile$'" 'titleline$'

# Go through all the sound files, one by one:

for ifile to numberOfFiles
    filename$ = Get string... ifile
    # A sound file is opened from the listing:
    Read from file... 'sound_directory$' 'filename$'
    # Starting from here, you can add everything that should be
    # repeated for every sound file that was opened:
    soundname$ = selected$ ("Sound", 1)
    To Pitch... time_step minimum_pitch maximum_pitch
    # Open a TextGrid by the same name:
    gridfile$ =
    "'textGrid_directory$' 'soundname$' 'textGrid_file_extension$'"
    if fileReadable (gridfile$)
        Read from file... 'gridfile$'
        # Find the tier number that has the label given in the form:
        call GetTier 'tier$' tier
        numberOfIntervals = Get number of intervals... tier
        # Pass through all intervals in the selected tier:
        for interval to numberOfIntervals
            label$ = Get label of interval... tier interval
            if label$ <> ""
                # if the interval has an unempty label, get its start
and end:

```



```

start = Get starting point... tier interval
start_ms = start * 1000
end = Get end point... tier interval
end_ms = end * 1000

# Duration in seconds = end of the interval - start
of the interval; to get milliseconds, we mulitply by 1000
duration = (end - start) * 1000

# get the Pitch information at that interval
select Pitch 'soundname$'
# (1) get the value of the minimum pitch
pitchmin = Get minimum... start end Hertz Parabolic
# (2) get the time the minimum pitch happens (note
that this is the time in the overall file, not the interval)
pitchmin_time = Get time of minimum... start end
Hertz Parabolic
# (3) get the time of the minimum pitch relative to
the start of the interval (mulitplying by 1000 gets this value in
milliseconds)
pitchmin_timeint = (pitchmin_time - start) * 1000

# (4) do the same for maximum
pitchmax = Get maximum... start end Hertz Parabolic
pitchmax_time = Get time of maximum... start end
Hertz Parabolic
pitchmax_timeint = (pitchmax_time - start) * 1000

# (5) get average
pitchmean = Get mean... start end Hertz

# Save result to text file:
resultline$ = "'soundname$' 'label$' 'start_ms'
'end_ms' 'duration' 'pitchmin' 'pitchmin_timeint' 'pitchmax'
'pitchmax_timeint' 'pitchmean' 'newline$'"
fileappend "'resultfile$'" 'resultline$'
select TextGrid 'soundname$'
endif
endfor
# Remove the TextGrid object from the object list
select TextGrid 'soundname$'

```

```

        Remove
    endif
    # Remove the temporary objects from the object list
    select Sound 'soundname$'
    plus Pitch 'soundname$'
    Remove
    select Strings list
    # and go on with the next sound file!
endfor

Remove

#-----
# This procedure finds the number of a tier that has a given label.

procedure GetTier name$ variable$
    numberOfTiers = Get number of tiers
    itier = 1
    repeat
        tier$ = Get tier name... itier
        itier = itier + 1
    until tier$ = name$ or itier > numberOfTiers
    if tier$ <> name$
        'variable$' = 0
    else
        'variable$' = itier - 1
    endif

    if 'variable$' = 0
        exit The tier called 'name$' is missing from the file
'soundname$'!
    endif
endproc

```

Appendix V: Praat Script Duration, Pitch, and Intensity Measurement

```
# This script goes through sound and TextGrid files in a directory,

# opens each pair of Sound and TextGrid, calculates the pitch maximum
# of each labeled interval, and saves results to a text file.
# To make some other or additional analyses, you can modify the script
# yourself... it should be reasonably well commented! ;)
#
# This script is distributed under the GNU General Public License.
# [adapted from] Copyright 4.7.2003 Mietta Lennes

form Analyze pitch maxima from labeled segments in files
  comment Directory of sound files
  text sound_directory /Users/katharineoneill/Desktop/test/
  sentence Sound_file_extension .wav
  comment Directory of TextGrid files
  text textGrid_directory /Users/katharineoneill/Desktop/test/
  sentence TextGrid_file_extension .TextGrid
  comment Full path of the resulting text file:
  text resultfile /Users/katharineoneill/Desktop/duration-results.txt
  comment Which tier do you want to analyze?
  sentence Tier Final
  comment Pitch analysis parameters
  positive Time_step 0.01
  positive Minimum_pitch_(Hz) 75
  positive Maximum_pitch_(Hz) 300
endform

# Here, you make a listing of all the sound files in a directory.
# The example gets file names ending with ".aif" from
C:\Users\Sarah\Desktop\Lana-textgrids\

Create Strings as file list... list
'sound_directory$'*'sound_file_extension$'
numberOfFiles = Get number of strings

# Check if the result file (e.g., results-pitch.txt) exists. If it does,
ask if you would like to overwrite the file.
if fileReadable (resultfile$)
```

```

        pause The result file 'resultfile$' already exists! Do you want to
        overwrite it?
        filedelete 'resultfile$'
    endif

    # Write a title row with column titles to the result file:
    # (remember to edit this if you add or change the analyses!)

    titleline$ = "Filename Segment label Start (ms)      End (ms) Duration
    (ms) Minimum pitch (Hz) Min pitch time (ms)      Maximum pitch (Hz) Max
    pitch time (ms)      Average pitch 'newline$'"
    fileappend "'resultfile$'" 'titleline$'

    # Go through all the sound files, one by one:

    for ifile to numberOfFiles
        filename$ = Get string... ifile
        # A sound file is opened from the listing:
        Read from file... 'sound_directory$'filename$'
        # Starting from here, you can add everything that should be
        # repeated for every sound file that was opened:
        soundname$ = selected$ ("Sound", 1)
        To Pitch... time_step minimum_pitch maximum_pitch
        # Open a TextGrid by the same name:
        gridfile$ =
        "'textGrid_directory$'soundname$'textGrid_file_extension$'"
        if fileReadable (gridfile$)
            Read from file... 'gridfile$'
            # Find the tier number that has the label given in the form:
            call GetTier 'tier$' tier
            numberOfIntervals = Get number of intervals... tier
            # Pass through all intervals in the selected tier:
            for interval to numberOfIntervals
                label$ = Get label of interval... tier interval
                if label$ <> ""
                    # if the interval has an unempty label, get its start
and end:

                    start = Get starting point... tier interval
                    start_ms = start * 1000
                    end = Get end point... tier interval
                    end_ms = end * 1000
                end if
            end for
        end if
    end for

```

```

        # Duration in seconds = end of the interval - start
of the interval; to get milliseconds, we mulitply by 1000
        duration = (end - start) * 1000

        # get the Pitch information at that interval
        select Pitch 'soundname$'
        # (1) get the value of the minimum pitch
        pitchmin = Get minimum... start end Hertz Parabolic
        # (2) get the time the minimum pitch happens (note
that this is the time in the overall file, not the interval)
        pitchmin_time = Get time of minimum... start end
Hertz Parabolic
        # (3) get the time of the minimum pitch relative to
the start of the interval (mulitplying by 1000 gets this value in
milliseconds)
        pitchmin_timeint = (pitchmin_time - start) * 1000

        # (4) do the same for maximum
        pitchmax = Get maximum... start end Hertz Parabolic
        pitchmax_time = Get time of maximum... start end
Hertz Parabolic
        pitchmax_timeint = (pitchmax_time - start) * 1000

        # (5) get average
        pitchmean = Get mean... start end Hertz

        # Save result to text file:
        resultline$ = "'soundname$' 'label$' 'start_ms'
'end_ms' 'duration'      'pitchmin'      'pitchmin_timeint' 'pitchmax'
'pitchmax_timeint' 'pitchmean'      'newline$'"
        fileappend "'resultfile$'" 'resultline$'
        select TextGrid 'soundname$'
    endif
endfor
# Remove the TextGrid object from the object list
select TextGrid 'soundname$'
Remove
endif
# Remove the temporary objects from the object list
select Sound 'soundname$'
plus Pitch 'soundname$'

```

```

        Remove
        select Strings list
        # and go on with the next sound file!
    endfor

Remove

#-----
# This procedure finds the number of a tier that has a given label.

procedure GetTier name$ variable$
    numberOfTiers = Get number of tiers
    itier = 1
    repeat
        tier$ = Get tier name... itier
        itier = itier + 1
    until tier$ = name$ or itier > numberOfTiers
    if tier$ <> name$
        'variable$' = 0
    else
        'variable$' = itier - 1
    endif

    if 'variable$' = 0
        exit The tier called 'name$' is missing from the file
        'soundname$'!
    endif

endproc

```

Appendix VI: Length of Word-Final Phenomena

LBS word-final affricates / + h/

Filename	Duration (ms)
1_051_piisimuhkaan-h	236.56310609491600
1_137_uchaapaanish-h	451.1058917230930
1_154_wiich-h	324.81744580323000
1_204_kuskusch-h	703.3925391309120
1_209_kaawaastaanikihchichaapiyich-h	617.7773660331200
2_051_piisimuhkaanich-h	213.08679491479100
2_154_Wiich-h	300.8389743424290
2_204_Kuskusch-h	317.86738656492200
2_209_kaawaastaanikihchichaapiyich-h	394.8323288733660
Average	395.586870386753

LBS word-final affricates

Filename	Duration (ms)
1_020_kuskusch	367.74983863983100
1_059_kilwaakis	122.29858157941100
1_082_kaawaastaanikihchichaapiyich	218.67465327401800
1_096_wiich	400.2926434888620
2_020_kuskusch	488.8404245930430
2_059_Kilwaakis	187.0984275796320
2_082_kaawaastaanikihchichaapiyich	307.2699754759400
2_096_wiich	433.1896699314950
Average	315.676776820279

LBS word-final continuants / + h/

Filename	Duration (ms)
1_010_uhkumis-h	256.96494183464800
1_027_muuhkumaanish-h	385.21962359559500
1_054_paashchishikinish-h	582.8705881088660
1_073_mitaas-h	343.51868812292400
1_114_mishchikush-h	294.8662717537710
1_115_utaanis-h	255.28980880902400
1_117_miinish-h	368.1367962381070
1_134_iiyiyukimikush-h	472.49972613114500

1_135_usikus-h	281.03392944121100
1_147_mitaas-h	261.6913505070600
1_168_uchishkwaachihchiish-h	337.41460648609900
1_182_saakihiikinipaakush-h	459.91798469548800
1_199_wiitimus-h	315.645043211465
1_212_uchishkwaachihchiish-h	355.7468420263990
2_001_muusuyaas-h	227.22037858753200
2_010_uhkumis-h	263.80674077599800
2_027_muuhkamaanish-h	303.90262738242300
2_054_paashchishikinish-h	506.88448002654400
2_073_mitaas-h	263.81667431851200
2_080_kilwaakis-h	143.7385988938160
2_114_mishchikush-h	308.9092999665320
2_115_utaanis-h	265.46948558339000
2_117_miinish-h	330.2037813797690
2_134_iiyiyiukimikush-h	389.61554587800000
2_135_usikus-h	344.53788494613400
2_137_uchaapaanish-h	217.4264890186430
2_147_mitass-h	334.0085233369560
2_182_saakihiikinipaaskush-h	367.6690038703580
2_199_wiitimus-h	240.71669053382800
2_212_uchishkwaachihchiish-h	270.1502555038270
Average	324.963088698802

LBS word-final continuants

Filename	Duration (ms)
1_001_muusuyaas	259.24237239244900
1_011_muuhkumaanish	335.2165074507340
1_016_uchaapaanish	344.00888531597600
1_018_muusuyaas	269.92135981242100
1_033_niwiitimus	280.87211624683700
1_037_wiyaas	298.7346727062680
1_038_iiyiyiukimish	395.6548457097520
1_040_nisikus	292.6982802601050
1_058_apis	535.4175796531530
1_067_nihkumis	420.4809923211870
1_087_miinish	390.0333275125590
1_107_mitaas	303.78161006531700
1_109_nitaanis	299.5611836268630
1_142_paashchishikinish	295.66599629164500
1_144_wiyaas	344.23434917582800
1_151_mitaas	249.44501308879900
1_159_apis	308.58364345457600

1_197_mishchikush	324.7088576513660
1_211_saakihikinipaakush	268.0471669186490
2_011_muuhkumaanish	290.5999361900690
2_016_uchaapaanish	336.98376875297000
2_018_muusuyaas	242.16718119861100
2_033_niwiitimus	271.7941181860620
2_037_wiyaas	287.9740514408460
2_040_nisikus	261.1661736719740
2_058_apis	322.496079878448
2_067_nihkumis	246.92029566702700
2_087_miinish	323.3196637521820
2_107_mitaas	289.94463942176500
2_109_nitaanis	311.38456563498200
2_142_paashchishikinish	325.039269453105
2_144_wiyaas	361.81012170843400
2_151_mitaas	361.32752416829300
2_159_apis	330.0226090106090
2_168_uschishkwaachihchiish	257.180893403635
2_197_mishchikush	326.34894047531000
2_211_saakihikinipaakush	248.7127085658200
Average	313.824359465801

LBS word-final nasals / + h/

Filename	Duration (ms)
1_055_muuhkumaan-h	217.32556605700400
1_057_mihtihkaan-h	137.92042786171300
1_064_usisim-h	89.48198315394280
1_084_utiyyim-h	192.4597297362850
1_088_uhkum-h	79.45871559006610
1_091_chiimaan-h	129.6480121080780
1_103_paashtaaumiichimh	0.02412314626853980
1_108_uskutimh	0.39708534414995
1_118_umushumh	0.12023931213889200
1_121_nitaaniskutaapaam-h	360.55627274069700
1_128_utiwaashishiimh	0.020084076402415700
1_136_aatiyuuhkaan-h	70.39585607883850
1_139_wiichishaan-h	121.78172203004300
1_143_miichimh	0.0005606578858952100
1_152_pipunikaanh	0.013085258239620100
1_165_utaanishkiwishiim-h	0.0026948635456491800
1_190_aaniskiwikinitihchaan-h	260.0001184970790

1_205_piihtiwipichiwiyaanaan-h	332.85459118321600
1_207_mitutisaanh	0.09075398373425970
2_009_aaniskiwikinitihchaan-h	27.394208129036800
2_055_muuhkumaan-h	199.29524354216900
2_057_mihtihkaan-h	0.004885362087314600
2_064_usisim-h	141.2940034082690
2_084_utiyyim-h	0.008882452652070330
2_088_uhkum-h	0.007964308954111490
2_091_chiimaan-h	142.17494639075000
2_103_paashtaaumiichim-h	67.19428602284960
2_108_uskutim-h	135.97572379485200
2_118_umushum-h	0.009363595076195000
2_121_n_-h	0.008667339335133310
2_128_utiwaashishiim-h	0.019890349331142000
2_136_aatiyuuhkaan-h	98.11054429258490
2_139_wiichishaan-h	0.02009976726125020
2_143_miichim-h	93.27463255101610
2_165_utaanishkiwishiim-h	90.58004322050020
2_205_piihtiwipichiwiyaanaan-h	280.20940662514600
2_207_mitutisaanh	68.81495986034650
Average	90.1878208835552

LBS word-final nasals

Filename	Duration (ms)
1_003_nitiyim	326.6820746489230
1_009_aaniskiwikinitihchaan	271.6972799699190
1_012_pipunikaan	233.08449530391100
1_019_miichim	1.48E-05
1_030_muuhkumaan	182.61021428150800
1_031_mihtihkaan	239.04976902385000
1_035_paashtaaumiichim	45.98646573922280
1_063_piisimuhkaan	280.807615044651
1_075_niichishaan	510.10597391711900
1_078_mitutisaan	316.65678425239900
1_089_nuuhkum	78.27138487765200
1_092_nitiwaashishiim	0.26362131178281300
1_095_nitaanishkutaapaam	135.97443162633400
1_116_chisihiikinaahtikw	9.80567873267102
1_126_nisisim	112.00591488627400
1_127_piihtiwipichiwiyaanaan	300.6004055368770
1_162_nitaanishkiwishiim	0.02637984730125000
1_173_uskutim	45.50655156567180
1_188_chiimaan	0.03132317196197220

1_195_nimushum	20.385747538914400
1_210_aatiyuuhkaan	0.016597165199971900
2_003_nitiyim	199.36759268756500
2_012_pipunikaan	0.03454649959655500
2_019_miichim	0.005459192642831570
2_030_muuhkumaanish_n_	86.82828630592000
2_031_mihtihkaan	218.79797079131200
2_035_paashtaaumiichim	0.004962902402372290
2_063_piisimiuhkaan	0.015188132548082900
2_075_niichishaan	616.1582897390020
2_078_mitutisaan	137.9460093788540
2_089_nuuhkum	80.12999766791220
2_092_nitiwaashishiim	96.35482778281410
2_095_nitaaniskutaapaam	119.42632807349300
2_126_nisisim	90.55797167077980
2_127_piihtuwupichiwiyaanaan	194.1934058696480
2_162_nitaanishkiwishiim	89.07618271669990
2_173_uskutim	109.89039186971300
2_188_chiimaanh	163.4762937687070
2_190_aaniskiwikinitihchaan	131.69695220219200
2_195_nimushum	140.56071992907800
2_210_aatiyuuhkaan	244.52789775909600
Average	142.161414589482

LBS word-final plosives / + h/

Filename	Duration (ms)
1_005_mitukihp-h	221.49464968045200
1_006_niimaawiniwit-h	224.20677520955100
1_007_misinihiikinaachiniwit-h	174.69163405862000
1_022_aamiukihp-h	314.9138705794410
1_028_wiyyisht-h	213.88753237521300
1_029_maaschiisk-h	159.00970365961100
1_036_chaachishaapaayaaukuhp-h	271.89313140098900
1_039_uschikimikw-h	237.12153373381800
1_048_waat-h	347.21665873810200
1_050_shuwiyaaniwit-h	358.3773732378490
1_056_chiskutimaatuukimikw-h	208.6459519664580
1_060_astaasuukimikw-h	215.43299416165800
1_066_chimuwinikuhp-h	278.24258163116200
1_068_piishaakinikuhp-h	152.81772323045300
1_074_shuwiyaanikimikw-h	329.20007925227400
1_079_akhup-h	104.4855148547040
1_085_uschisk-h	267.04886918649900

1_100_wiikhwaayaaukuhp-h	28.500387771473300
1_110_shiipaachipiyuwikuhp-h	263.95868274544700
1_111_shiipaachipiyuwikuhp-h	213.3948529712630
1_113_chiipiimishtikuwit-h	370.4775944818020
1_119_panikiik-h	237.0018596437640
1_122_nimihtinikaat-h	173.36052197486600
1_129_nimihtinikaat-h	153.96126243844900
1_131_mishtikw-h	213.70403335688000
1_132_chiipiikimikw-h	195.25617190794400
1_149_uut-h	228.13625594211900
1_155_uwaatinikuhp-h	136.73660572275900
1_156_miiwit-h	199.88297568362700
1_157_chishaayaakwaapit-h	226.44698641852800
1_170_miichisuukimikw-h	241.45935897922400
1_171_nipaaukimikw-h	177.96633695829100
1_175_chisihiikinaahtikw-h	151.20739634381500
1_184_miinaahtikw-h	206.05009557357500
1_191_iiyimiichiwaahp-h	232.55014503842300
1_200_nisk-h	219.54618908115400
1_206_iyik-h	264.570276067853
2_005_mitukihp-h	253.83935214655000
2_006_Niimaawiniwit-h	222.87063025523500
2_007_Misinihiikinaachiniwit-h	195.65131786686600
2_022_aamiiukihp-h	95.4564308075332
2_028_wiiysht-h	254.31876360993700
2_029_maschisk-h	158.19857333438500
2_036_chaachishaapaayaaukuhp-h	97.42101404906030
2_039_uschikimikw-h	153.8072925130170
2_048_waat-h	329.4343076456820
2_050_Shuwiyaaniwit-h	370.54157664896300
2_056_Chiskutimaatuukimikw-h	3699.355326844610
2_056_Chiskutimaatuukimikw-h	199.5436430438990
2_066_chimuwinikuhp-h	195.4764196812480
2_068_piishaakinikuhp-h	158.9147491578460
2_074_shuwuyaanimikimikw-h	166.4887658450470
2_079_akhup-h	72.76688076470790
2_085_uschisk-h	227.00415420370000
2_100_wiikhwaayaaukuhp-h	61.42656732397620
2_110_shiipaachipiyuwikuhp-h	243.29312369783200
2_113_Chiipiimishtikuwit-h	250.8559331756600
2_119_panikik-h	249.43623626926200
2_122_Nimihtinikaat-h	220.36929555364200
2_131_mishtikw-h	198.50673737270600
2_132_chiipiikimikw-h	220.69430944047600

2_149_Uut-h	253.59142783748100
2_155_uwaatinikuhp-h	274.2470300966730
2_156_Miiwit-h	204.69465821893900
2_157_Chishaayaakwaapit-h	199.7076341857060
2_170_miichisuukimikw-h	295.82942515643800
2_171_nipaaukinikw-h	295.64104331220100
2_172_chimuwinikuhp-h	114.99057333757000
2_175_chisihiikinaahtikw-h	156.34840055006600
2_176_wiyyisht-h	203.0605405364580
2_184_miinaahtikw-h	241.86646334583500
2_191_iiyimiichiwaahp-h	255.65674230999800
2_200_nisk-h	347.98598785401900
2_206_iyik-h	259.17136971344900
2_208_mishtikuwit-h	351.67968778105800
Average	266.173292687278

LBS word-final plosives

Filename	Duration (ms)
1_004_uut	204.13560426834000
1_021_uwaatinikuhp	191.38385417308700
1_023_mitukihp	127.1034669924840
1_024_miiwit	239.88910755720700
1_026_chaachishaapaayaaukuhp	106.45481938817900
1_034_uschikimikw	119.04124156415600
1_043_waat	312.1120503923930
1_045_iitaamiskimikw	209.82744094127300
1_049_chiipiikimikw	112.2028124878350
1_052_akhup	80.75700307441740
1_053_misinihiikinaachiniwit	133.9709417577420
1_061_wiikhwaayaaukuhp	145.03063032743300
1_062_iiyimiichiwaahp	173.25842280559000
1_069_miinaahtikw	92.08440313593200
1_071_piishaakinikuhp	71.48016059063260
1_094_shuwiyaaniwit	137.2703198635040
1_098_aamiiukihp	191.00815745322300
1_104_chishaayaakwaapit	303.78815653391000
1_123_nipaaukimikw	69.78037780263960
1_145_miichisuukimikw	430.65388099595900
1_166_mishtikw	152.81528738644800
1_169_niimaawiniwit	338.52405676217500
1_172_chimuwinikuhp	118.54487349338300
1_176_wiyyisht	253.54229398760800
1_178_astaasuukimikw	232.26448904469100

1_185_shuwiyaanikimikw	138.80059771807400
1_193_chiipiimishtikuwit	381.28058136203300
1_196_chiskutimaatuukimikw	511.5774566453990
1_208_kishkichaau_mishtikuwit	392.1109428004190
2_004_uut	96.04772817999320
2_021_uwaatinikuhp	81.1774690492193
2_023_mitukihp	281.23011273687400
2_024_miiwit	137.00965663425100
2_026_chaachishaapaayaakuhp	114.28714314891900
2_034_uschikimikw	142.62266041461800
2_038_iiyiyiukimikw	464.3522560293820
2_043_waat	345.02436618877400
2_045_iitaamiskimikw	277.82551214383100
2_049_chiipiikimikw	133.96305035530700
2_052_akuhp	36.86824683029230
2_053_misinihiikinaachiniwit	197.1192955335130
2_060_astaasuukimikw	323.7982347939160
2_061_wiikhwaayaaukuhp	111.81322526342100
2_062_iiyimiichiwaahp	373.39287420619900
2_069_miinaahtikw	236.54739946225600
2_071_piishaakinikuhp	175.52718238202300
2_094_shuwiyaaniwit	323.89566203303400
2_098_aamiiukihp	213.30146057758300
2_104_chishaayaakwaapit	236.70161314841400
2_111_shiipaachipiyuwikuhp	291.3052859356190
2_116_chisihiikinaahtikw	261.5972735724960
2_123_nipaaukimikw	316.74835645940000
2_129_nimihtinikaat	249.93395977154300
2_145_miichisuukimikw	112.50598369973500
2_166_mishtikw	158.1084493087150
2_169_niimaawiniwit	341.57151194790700
2_178_astaasuukinikw	214.79585265793200
2_185_shuwiyaanikinikw	292.6312821815370
2_193_chiipiimishtikuwit	381.7518380591610
2_196_chiskutimaatuukimikw	415.994161849075
Average	221.835708931018

LBS word-final vowels / + h/

Filename	Duration (ms)
1_002_piskustihchaau-h	30.462826905018200
1_015_kaanichii-h	167.7696923322970
1_025_uskaataayaapii-h	180.55535567901200
1_032_mihtiwikii-h	151.22401686389300

1_042_maaskiniu-h	157.3649409786680
1_044_kishkichaau-h	108.28421238022600
1_076_miyiu-h	212.26613435145700
1_077_wichii-h	249.05284684103700
1_081_iischiimaauschii-h	230.61183607356200
1_083_mishkushiu-h	0.40210115902361600
1_097_miinaapuu-h	150.7164402387370
1_101_mitihchii-h	259.1646236842640
1_102_shikutaau-h	106.42293051319100
1_125_uschihtaasiu-h	322.62031530815700
1_133_upishtaahuyuu-h	198.9283898003250
1_138_siipii-h	139.35211281628600
1_140_aschii-h	189.4050114652820
1_158_waau-h	207.0674103738990
1_163_muushtaau-h	322.2809764209610
1_174_nichishkaatuu-h	178.4682799721980
1_177_uniwii-h	123.8648587319150
1_183_uskaataayaapii-h	136.23641044417200
1_201_utimiskumaau-h	499.3251429531670
1_202_uchischiwaahiichaau-h	0.006402787122716800
1_215_chuuchuu-h	183.11569371595700
2_015_kaanichii-h	207.13661050707700
2_032_mihtiwikii-h	133.62280143786600
2_042_maaskiniu-h	121.62680022230000
2_044_kishkichaau-h	92.75959595125510
2_076_miyiu-h	152.09684997474900
2_077_wichii-h	128.56733959727700
2_081_iischiimaauschii-h	284.23309281525900
2_083_mishkushiu-h	0.002303098331601920
2_097_miinaapuu-h	279.91401058760100
2_101_mitihchii-h	192.55101769457600
2_102_shikutaau-h	81.4523360021453
2_124_wiichiyyiyiu-h	68.69620865974470
2_133_upishtaahuyuu-h	0.006284186462757190
2_138_siipii-h	101.87498615807100
2_140_aschii-h	175.89846720498400
2_183_uskaataayaapii-h	178.99459999082800
2_201_utimiskumaau-h	0.0077247059944163300
2_202_uchuschiwaahiichaau-h	154.6893836772260
2_203_nichishkaatuu-h	70.79652316962460
2_215_chuuchuu-h	67.00165244409770
Average	155.486612241673

LBS word-final vowels

Filename	Duration (ms)
1_013_miinaapuu	216.25070572091000
1_014_muushtaau	96.65619717942200
1_041_waau	91.6009915011009
1_046_mitihchii	236.5022288676310
1_047_maaskiniu	70.32531223254510
1_070_uniwii	292.9191913400870
1_072_iischiimaauschii	431.8712066095250
1_106_chuuchuu	255.2090503811670
1_141_niwiichiiyiyiu	443.8255131373210
1_148_mihtiwikii	303.53912905191500
1_150_utimiskumaau	150.81704803556300
1_153_uchischiwaahiichaau	305.9118296422360
1_160_upishtaahuyuu	223.62418335424600
1_164_wichii	425.91582049329800
1_167_uskaataayaapii	177.396156070877
1_180_siipii	218.5946387513310
1_181_piskustihchaau	112.36043341917200
1_187_shikutaau	80.81502427641180
1_189_miyiu	212.55715835290200
1_192_aschii	300.64642722642400
1_194_kaanichii	211.0258395871110
1_198_mishkushiu	142.97273358550600
1_213_uschihtaasiu	189.25835966796400
1_214_uskaataayaapii	165.36088786302400
2_002_piiskustihchaau	374.45348001535900
2_013_miinaapuu	163.1940859943000
2_014_muushtaau	0.08290311420999790
2_041_waau	31.251395491680400
2_046_mitihchii	3130.9251473093400
2_046_mitihchii	20.69198770584450
2_047_maaskiniu	0.01480560997935140
2_070_uniwii	14.808849971104500
2_072_iischiimaauschii	387.6680494192390
2_106_chuuchuu	42.55571722023270
2_125_uschihtaasiu	118.90437861065200
2_141_niwiichiiyiyiu	207.15728890722200
2_180_siipii	323.49601662346700
2_181_piskustihchaau	413.0442836274660
2_187_shikutaau	215.2135128953120
2_189_miyiu	89.44993122993420
2_192_aschii	310.9139764655420

2_194_kaanichii	236.66191259222300
2_198_mishkushiu	65.84528606371750
2_213_uschihtaasiu	206.9414345524950
2_214_uskaataayaapii	144.54130437534800
Average	263.417151425386

JN word-final affricates / + h/

Filename	Duration
3_051_piisimuhkaanich-h	880.8430439773670
3_204_kuskusch-h	708.1096146424640
3_209_kaawaastaanikihchichaapiyich-h	823.0027347309270
Average	803.985131116919

JN word-final affricates

Filename	Duration
3_020_kuskusch	853.0278853356220
3_082_kaawaastaanikihchichaapiyich	938.0276242220860
3_096_wiich	862.4860432073450
Average	884.513850921684

JN word-final continuants / + h/

Filename	Duration
3_005_mitukuhp-h	282.28469836240600
3_010_uhkumis-h	968.5912064527620
3_027_muuhkamaanish-h	1164.9157237204400
3_036_chaachishaapaauaaukuhp-h	706.8545948339600
3_054_paashchishikinish-h	930.5648274033760
3_073_mitaas-h	1246.7497879215900
3_100_wiikhwaayaaukuhp-h	937.5707164147230
3_110_shiipaachipiyuwikuhp-h	936.780245180211
3_114_mishchikush-h	1006.0409612140500
3_115_utaanis-h	1517.2405552127500
3_134_iiyiyiukimikush-h	1114.5905661775700
3_135_usikus-h	1118.1761165186000
3_137_uchaapaanish-h	1042.6979314091000
3_182_saakihikiinipaaskush-h	708.10535864945
3_199_wiitimus-h	1089.8044988160300
3_212_uchishkwaachihchiish-h	905.2116192813510
Average	1030.83961145632

JN word-final continuants

Filename	Duration
3_011_muuhkumaanish	980.0421682139930
3_016_uchaapaanish	481.0740627031550
3_018_muusuyaas	1131.162966723390
3_021_uwaatinikuhp	205.35150225175600
3_023_mitukihp	261.2488174295640
3_026_chaachishaapaayaakuhp	237.95293219935200
3_033_niwiitimus	1323.0315592892000
3_040_nisikus	1106.4625445984700
3_062_iiyimiichiwaahp	428.03599900014700
3_067_nihkumis	968.7221075812580
3_087_miinish	842.9847634084870
3_107_mitaas	956.3448198850690
3_109_nitaanis	965.0945327539300
3_111_shiipaachipiyuwikuhp	261.8887099941690
3_142_paashchishikinish	885.1138238666750
3_144_wiyaas	1013.5253058508300
3_151_mitaas	964.2091026501610
3_159_apis	1071.1227771454000
3_168_uschishkwaachihchiish	924.0961134832470
3_172_chimuwinikuhp	584.0936932745510
3_197_mishchikush	938.0446704186130
3_211_saakihikinipaakush	977.3670635650780
Average	838.082742149601

JN word-final nasals / + h/

Filename	Duration
3_009_aaniskiwikinitihchaan-h	868.8129276722740
3_055_muuhkumaan-h	997.0612187060360
3_057_mihtihkaan-h	1004.6658689219900
3_084_utiyiyim-h	1053.164314921510
3_088_uhkum-h	545.4266241206660
3_091_chiimaan-h	684.9126371314220
3_103_paashtaaumiichim-h	642.4332988161080
3_108_uskutim-h	760.9093637105090
3_118_umushum-h	587.1632364191810
3_128_utiwaashishiim-h	1090.9168802907800
3_136_aatiyuuhkaan-h	902.822283759039
3_139_wiichishaan-h	838.6167345435650

3_143_miichim-h	736.4312685463500
3_165_utaanishkiwishiim-h	606.3453258825570
3_205_piihtiwipichiwiyaanaan-h	841.803697592415
3_207_mitutisaan-h	1052.131795646430
Average	825.851092292552

JN word-final nasals

Filename	Duration
3_003_nitiyim	644.3770855656390
3_019_miichim	960.5778324473700
3_031_mihtihkaan	779.3469180826620
3_035_paashtaaumiichim	829.6445635949020
3_063_piisimihkaan	817.6899366974210
3_075_niichishaan	1062.0287804979500
3_078_mitutisaan	1457.6229517835100
3_089_nuuhkum	861.8904076214050
3_092_nitiwaashishiim	1026.0366673936000
3_095_nitaaniskutaapaam	1002.5098639199400
3_127_piihtuwupichiwiyaanaan	942.1995769334320
3_162_nitaanishkiwishiim	940.5906777711180
3_173_uskutim	662.7415423446070
3_188_chiimaan	635.0377432339340
3_190_aaniskiwikinitihchaan	810.9426321189010
3_195_nimushum	850.1728284635770
3_210_aatiyuuhkaan	838.0206695300920
Average	889.495922235298

JN word-final plosives

Filename	Duration (ms)
3_006_niimaawiniwit-h	159.8137695714620
3_007_misinihiikinaachiniwit-h	768.8371216855150
3_028_wiisht-h	198.57298036548200
3_029_maschisk-h	518.5253174113770
3_039_uschikimikw-h	991.3066977234380
3_048_waat-h	674.9015920848610
3_050_shuwiyaaniwit-h	864.8570140622560
3_056_chiskutimaatuukimikw-h	873.0168712511500
3_066_chimuwinikuhp-h	765.4521889417530
3_068_piishaakinikuhp-h	833.8868945392490
3_074_shuwuyaanimikw-h	1077.2159076082900
3_079_akhup-h	1307.7245933267100

3_085_uschisk-h	958.4176442861570
3_113_mishtikuwit-h	997.3500451134460
3_119_panikik-h	1097.1053054612800
3_131_mishtikw-h	961.2332715112860
3_132_chiipiikimikw-h	706.0061925759800
3_149_uut-h	943.3806484348930
3_155_uwaatinikuhp-h	907.3802570188900
3_156_miiwit-h	1036.6259034971300
3_157_chishaayaakwaapit-h	785.1403140124170
3_170_miichisuukimikw-h	692.6562360598910
3_171_nipaaukinikw-h	717.1807389322590
3_184_miinaahtikw-h	889.652838751326
3_200_nisk-h	617.9509481277700
3_206_iyik-h	939.9775521253640
3_iiyimiichiwaahp-h	1049.9743092112500
Average	827.190487173737

JN word-final plosives

Filename	Duration (ms)
3_004_uut	695.6786953879440
3_024_miiwit	586.1554928359980
3_034_uschikimikw	864.888397475569
3_038_iiyiyiukimikw	333.4067523765200
3_043_waat	717.6687072114320
3_045_iitaamiskimikw	178.98515357727800
3_049_chiipiikimikw	1002.4725556771300
3_052_akhup	180.7633983290050
3_053_misinikiikinaachiniwit	983.5741556954980
3_061_wiikhwaayaaukuhp	911.823469415902
3_069_miinaahtikw	1034.394280502490
3_071_piishaakinikuhp	836.0539924322670
3_094_shuwiyaaniwit	903.0338406146660
3_104_chishaayaakwaapit	908.2454388643650
3_123_nipaaukimikw	502.1128430970560
3_129_nimihtinikaat	1159.7108095171000
3_145_miichisuukimikw	750.218203188739
3_166_mishtikw	522.6931479733680
3_169_niimaawiniwit	708.7905986386360
3_176_wiisist	891.8458367274730
3_185_shuwiyaanikinikw	736.5851604942870
3_193_chiipiimishtikuwit	827.7381437361960
3_196_chiskutimaatuukimikw	956.9176230441180
3_208_mishtikuwit	417.44409054294700

Average	733.800032806499
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JN word-final vowels / + h/

Filename	Duration
3_015_kaanichii-h	1102.7707237181300
3_025_uskaataayaapii-h	1022.3888673510000
3_032_mihtiwikii-h	994.5636024921850
3_042_maaskiniu-h	920.0528830767090
3_076_miyiu-h	860.6115701267070
3_077_wichii-h	895.2519417287200
3_081_iischiimaauschii-h	1463.1947887383100
3_083_mishkushiu-h	565.0155096164700
3_097_miinaapuu-h	1015.2427690358900
3_101_mitihchii-h	1153.9719051135500
3_102_shikutaau-h	919.0572480930420
3_124_wiichiyyiyiu-h	982.3040125060890
3_138_siipii-h	1169.1796002327500
3_140_aschii-h	1002.2519356431500
3_158_waau-h	687.8875192204900
3_163_muushtaau-h	836.1167649789330
3_174_nichishkaatuu-h	714.9030763364050
3_177_uniwii-h	1011.8555391857000
3_183_uskaataayaapii-h	840.1298555876090
3_201_vowel-h	1097.932273240270
3_202_uchuschiwaahiichaau-h	307.6035706294240
Average	931.537426507216

JN word-final vowels

Filename	Duration
3_013_miinaapuu	1011.5497159161500
3_014_muushtaau	694.0903484937860
3_041_waau	103.44225281865300
3_046_mitihchii	784.5747639549610
3_047_maaskiniu	1088.1919855937400
3_070_uniwii	723.0837886979300
3_072_iischiimaauschii	698.3405405354850
3_125_uschihtaasiu	723.2708409055110
3_141_niwiichiyyiyiu	1063.666530257340
3_148_mihtiwikii	743.0992051026840
3_150_vowel	1235.2185418435800
3_153_uchischiwaahiichaau	728.9173442853470

3_164_wichii	1012.0347663439300
3_167_uskaataayaapii	689.914828997757
3_180_siipii	991.1586450332860
3_181_piskustihchaau	1090.0081960092700
3_187_shikutaau	1001.6615124331800
3_189_miyiu	905.9193537251700
3_192_aschii	1145.7294904969100
3_194_kaanichii	949.6161591602940
3_198_mishkushiu	707.0520046687460
3_214_uskaataayaapii	748.6682085434770
Average	856.327682900781

MN word-final affricates / + h/

Filename	Duration
5_051_piisimuhkaanich-h	297.4381874420570
5_154_wiich-h	289.6021772883340
5_209_kaawaastaanikihchichaapiyich-h	519.9004790357670
6_051_piisimuhkaanich-h	282.56388091600600
6_154_wiich-h	319.61077573711900
6_209_kaawaastaanikihchichaapiyich-h	227.0818641401340
Average	322.699560759903

MN word-final affricates

Filename	Duration
5_082_kaawaastaanikihchichaapiyich	366.0708090729040
5_096_wiich	318.8893215153580
6_082_kaawaastaanikihchichaapiyich	300.8078060960860
6_096_wiich	351.3028429310370
Average	334.267694903846

MN word-final continuants / + h/

Filename	Duration
5_010_uhkumis-h	350.9183185574660
5_027_muuhkamaanish-h	295.1281156218520
5_054_paashchikinish-h	375.4216309243200
5_073_mitaas-h	362.2922013382340
5_114_mishchikush-h	410.0093854508720
5_115_utaanis-h	338.2504567177190

5_117_miinish-h	338.451966185319
5_134_iiyiyiukimikush-h	440.67552041812000
5_135_usikus-h	534.3344010468630
5_137_uchaapaanish-h	303.08115693883900
5_182_saakihiikinipaaskush-h	493.3316104187410
5_199_wiitimus-h	468.00335774320900
5_212_uchishkwaachihchiish-h	352.4360071153280
6_010_uhkumis-h	379.29401079151800
6_027_muuhkamaanish-h	326.096271830826
6_054_paashchikinish-h	392.5426366062260
6_073_mitaas-h	429.6925859480120
6_114_mishchikush-h	389.0019659206030
6_115_utaanis-h	360.1614598061660
6_117_miinish-h	429.856481596818
6_134_iiyiyiukimikush-h	402.6530685095950
6_135_usikus-h	337.0831351415740
6_137_uchaapaanish-h	262.1022176010860
6_182_saakihiikinipaaskush-h	501.9273185930340
6_199_wiitimus-h	443.18944431412200
6_212_uchishkwaachihchiish-h	390.4245402044590
Average	391.073886235547

MN word-final continuants

Filename	Duration
5_011_muuhkumaanish	361.6224778749540
5_016_uchaapaanish	333.9381665929460
5_018_muusuyaas	404.0197801811500
5_033_niwiitimus	303.2030732744960
5_038_iiyiyiukimikw	454.28600093621200
5_040_nisikus	502.3834137822330
5_067_nihkumis	292.9702188000680
5_087_miinish	285.57948293032000
5_107_mitaas	337.62200078122400
5_109_nitaanis	345.0337848386980
5_142_paashchishikinish	389.1358858725400
5_144_wiyaas	364.18888827115100
5_168_uschishkwaachihchiish	359.4067158537000
5_197_mishchikush	417.6744340115220
5_211_saakihiikinipaakush	486.0230884436370

6_011_muuhkumaanish	372.50304278315100
6_016_uchaapaanish	355.5263728882530
6_018_muusuyaas	402.91252071334300
6_033_niwiitimus	286.5473902875960
6_038_iiyiyiukimikw	518.2808615940010
6_040_nisikus	391.05734981815100
6_067_nihkumis	298.23924048312300
6_087_miinish	297.62557078109400
6_107_mitaas	379.5518452551670
6_109_nitaanis	426.5636925659350
6_142_paashchishikinish	353.59080111732300
6_144_wiyaas	375.3440518358420
6_168_uschishkwaachihchiish	390.3144274180550
6_197_mishchikush	424.4213594950790
6_211_saakihiikinipaakush	535.9791901474490
Average	381.518170987614

MN word-final nasals /+ h/

Filename	Duration
5_055_muuhkumaan-h	228.94282522191000
5_057_mihtihkaan-h	209.73689951154800
5_064_usisim-h	266.5111779621190
5_084_utiyyim-h	230.4781661247590
5_088_uhkum-h	180.7903112504240
5_091_chiimaan-h	176.19581752991900
5_103_paashtaaumiichim-h	106.69436363953600
5_108_uskutim-h	213.9461919940940
5_118_umushum-h	158.94427860715500
5_128_utiwaashishiim-h	165.22648509215200
5_136_aatiyuuhkaan-h	169.84738375719900
5_139_wiichishaan-h	52.1779986211297
5_143_miichim-h	148.69017853337400
5_152_pipunikaan-h	198.1949412817550
5_165_utaanishkiwishiim-h	72.5974606586255
5_205_piihtiwipichiwiyaanaan-h	270.36559802585500
5_207_mitutisaan-h	259.6053910466530
6_055_muuhkumaan-h	192.1007680141080
6_057_mihtihkaan-h	146.7249369702350
6_064_usisim-h	148.66167528039900

6_084_utiyyim-h	173.03200820388200
6_088_uhkum-h	219.06505661050600
6_091_chiimaan-h	243.37275161626900
6_103_paashtaaumiichim-h	323.99857434153500
6_108_uskutim-h	197.25466496358900
6_118_umushum-h	245.56532601501900
6_128_utiwaashishiim-h	207.36679570003600
6_136_aatiyuuhkaan-h	173.3877391417570
6_139_wiichishaan-h	229.90806369332700
6_143_miichim-h	253.0121606349030
6_152_pipunikaan-h	178.6523293621670
6_165_utaanishkiwishiim-h	211.36854883591300
6_205_piihtiwipichiwiyaanaan-h	239.49831389172300
6_207_mitutisaan-h	199.4677235402780
Average	196.805379578643

MN word-final nasals

Filename	Duration
5_003_nitiyim	151.41565010336400
5_012_pipunikaan	197.99525397223400
5_019_miichim	258.4148195647550
5_030_muuhkumaanish	238.86601500434000
5_031_mihthikaan	192.4977318693200
5_035_paashtaaumiichim	266.08377902320400
5_063_piisimiuhkaan	214.2384820788940
5_075_niichishaan	250.49375028653800
5_078_mitutisaan	228.3901120454270
5_089_nuuhkum	201.6149388891050
5_092_nitiwaashishiim	215.48848013698500
5_095_nitaaniskutaapaam	206.21902564775800
5_126_nisisim	139.9559279025520
5_127_piihtuwupichiwiyaanaan	170.93665029704400
5_162_nitaanishkiwishiim	302.0294669926810
5_173_uskutim	260.9344964387710
5_188_chiimaan	202.88959473814700
5_195_nimushum	191.581463464475
5_210_aatiyuuhkaan	247.74394001811700
6_003_nitiyim	196.96578153896700
6_012_pipunikaan	123.57371285570300

6_019_miichim	152.98992245135200
6_030_muuhkumaanish	275.85188773067100
6_031_mihthikaan	196.43439572442900
6_035_paashtaaumiichim	161.8828751353460
6_063_piisimihkaan	141.67726115364000
6_075_nichishaan	193.45236787742700
6_078_mitutisaan	180.950400597244
6_089_nuuhkum	159.43117380848100
6_092_nitiwaashishiim	127.31362743245600
6_095_nitaaniskutaapaam	144.48406210768100
6_126_nisisim	208.71533945324300
6_127_piihtuwupichiwiyaanaan	165.60993906869400
6_162_nitaanishkiwishiim	191.25033934434800
6_173_uskutim	230.98061023643400
6_188_chiimaan	154.5371909646870
6_195_nimushum	215.26017340319600
6_210_aatiyuuhkaan	192.23933837107500
Average	198.7207888876

MN word-final plosives / + h/

Filename	Duration
5_005_mitukihp-h	289.99874330115100
5_006_niimaawiniwit-h	208.95496411910600
5_007_misinihiikinaachiniwit-h	145.89591625503700
5_029_maschisk-h	283.61778007811500
5_036_chaachishaapaayaaukuhp-h	268.018110976415
5_039_uschikimikw-h	204.478586101964
5_050_shuwiyaaniwit-h	205.90304914238300
5_056_chiskutimaatuukimikw-h	227.36242876435900
5_060_astaasuukimikw-h	197.15781424219500
5_061_wiikhwaayaaukuhp-h	160.87320613386500
5_066_chimuwinikuhp-h	226.97451776043300
5_068_piishaakinikuhp-h	242.93869840519100
5_074_shuwuyaanimikimikw-h	155.16354427818400
5_079_akhup-h	220.64952309817200
5_085_uschisk-h	290.3711271303900
5_086_uut-h	361.15623907293500
5_100_wiikhwaayaaukuhp-h	189.20790455339400
5_113_chiipiimishtikuwit-h	305.2338377846270

5_119_panikik-h	399.2512372237470
5_131_mishtikw-h	443.5714070516050
5_132_chiipiikimikw-h	257.47672543535300
5_149_uut-h	205.44943055145800
5_155_uwaatinikuhp-h	316.5993879132740
5_156_miiwit-h	169.2131757692190
5_157_chishaayaakwaapit-h	211.63626424765200
5_170_miichisuukimikw-h	218.11619175464400
5_171_nipaaukinikw-h	202.26888177215800
5_184_miinaahtikw-h	311.756998247529
5_191_iiyimiichiiwaahp-h	314.07328638631600
5_200_nisk-h	218.32756939439100
5_206_iyik-h	306.10002455596900
5_48_waat-h	253.97033796511200
6_005_mitukihp-h	186.23698599047000
6_006_niimaawiniwit-h	203.6163086843030
6_007_misinihiikinaachiniwit-h	171.6529283990950
6_029_maschisk-h	253.1807910062050
6_036_chachishaapaayaaukuhp-h	197.76239059859100
6_039_uschikimikw-h	255.38950512835300
6_048_waat-h	274.37096620196400
6_050_shuwiyaaniwit-h	260.3100196862950
6_056_chiskutimaatuukimikw-h	279.9992440629890
6_060_astaasuukimikw-h	174.31607057743700
6_066_chimuwinikuhp-h	191.83296623480800
6_068_piishaakinikuhp-h	197.77155076272400
6_074_shuwuyaanimikimikw-h	297.4875068212480
6_079_akhup-h	215.31442022843200
6_085_uschisk-h	247.46798882886900
6_086_uut-h	315.47688858592400
6_100_wiikhwaayaaukuhp-h	219.83373194790600
6_113_chiipiimishtikuwit-h	233.30872893058600
6_119_panikik-h	282.22222119079600
6_131_mishtikw-h	240.02827076537900
6_132_chiipiikimikw-h	182.60476989732900
6_149_uut-h	135.59022610261900
6_155_uwaatinikuhp-h	175.11131166753900
6_156_miiwit-h	148.78683120539200
6_157_chishaayaakwaapit-h	154.3724795193110
6_170_miichisuukimikw-h	196.74015855228800

6_171_nipaaukinikw-h	224.77518322237100
6_184_miinaahtikw-h	188.7302835993320
6_191_iiyimiichiwaahp-h	244.39428942792000
6_200_nisk-h	327.5997988559820
6_206_iyik-h	210.28965381655300
Average	236.481609205799

MN word-final plosives

Filename	Duration
5_004_uut	184.45343019104100
5_021_uwaatinikuhp	250.49750343281600
5_023_mitukihp	299.2413250704130
5_024_miiwit	122.72694487148900
5_026_chaashishaapaayaakuhp	174.75002179403800
5_034_uschikimikw	268.21158211641300
5_043_waat	148.69339880646000
5_045_iitaamiskimikw	212.08559807620400
5_049_chiipiikimikw	359.7039039546260
5_052_akuhp	109.62385871692200
5_053_misinihiikinaachiniwit	224.01050733295100
5_062_iiyimiichiwaahp	213.79157139212500
5_069_miinaahtikw	191.76903110175100
5_071_piishaakinikuhp	137.9199743735510
5_094_shuwiyaaniwit	259.64453134355300
5_104_chishaayaakwaapit	193.53896108140900
5_123_nipaaukimikw	158.41068617120600
5_129_nimihtinikaat	236.35193280859100
5_145_miichisuukimikw	227.75865659143800
5_166_mishtikw	224.79302163919900
5_169_niimaawiniwit	204.44127669680700
5_172_chimuwinikuhp	243.70732098197900
5_178_astasuukinikw	290.825640659732
5_185_shuwiyaanikinikw	122.5283953714770
5_193_chiipiimishtikuwit	157.15791765235600
5_196_chiskutimaatuukinikw	319.2112075150920
5_208_mishtikuwit	233.54087229899200
6_004_uut	232.98189031337000
6_021_uwaainikuhp	203.2636725799460
6_023_mitukihp	162.8429676194400

6_024_miiwit	209.66731979208100
6_026_chaashishaapaayaakuhp	176.95877869707900
6_034_uschikimikw	229.60247813989000
6_043_waat	116.08235977663100
6_045_iitaamiskimikw	255.45984815049400
6_049_chiipiikimikw	240.61110100274600
6_052_akuhp	275.02812538635400
6_053_misinihiikinaachiniwit	242.46277460748300
6_061_wiikhwaayaakuhp	238.89317390922700
6_062_iiyimiichiwaahp	179.69515780290500
6_065_uut	254.84185295042900
6_069_miinaahtikw	273.39267335530100
6_071_piishaakinikuhp	169.11476573073300
6_094_shuwiyaaniwit	210.06679907927000
6_104_chishaayaakwaapit	200.14934455213900
6_123_nipaaukimikw	186.18844878545400
6_129_nimihtinikaat	138.94602871087600
6_145_miichisuukimikw	210.57287970465400
6_166_mishtikw	174.54531081569500
6_169_niimaawiniwit	177.25194412600800
6_172_chimuwinikuhp	152.07941384499900
6_178_astaasuukinikw	97.4481369864797
6_185_shuwiyaanikinikw	163.66944208164100
6_193_chiipiimishtikuwit	142.24692085912100
6_196_chiskutimaatuukinikw	130.37839773038400
6_208_mishtikuwit	143.70335402580300
Average	202.813114877844

MN word-final vowels / + h/

Filename	Duration
5_015_kaanichii-h	354.7151330035510
5_025_uskaataayaapii-h	286.8684032010200
5_032_mihtiwikii-h	187.51445822256900
5_042_maaskiniu-h	150.8031639423670
5_044_kishkichaau-h	237.5392149969480
5_081_iischiimaauschii-h	225.29135367166000
5_083_mishkushiu-h	212.23882305066000
5_097_miinaapuu-h	162.77690042582700
5_101_mitihchii-h	306.2033823423710

5_102_shikutaau-h	215.1701067061850
5_124_wiichiyyiyiu-h	158.51193272615000
5_138_siipii-h	158.49340880409100
5_140_aschii-h	180.04428502230400
5_158_waau-h	146.66375252612000
5_163_muushtaa-h	191.91590391067400
5_174_nichishkaatuu-h	208.8331638878830
5_177_uniwii-h	174.14417015120500
5_179_pipaayihtaamuu-h	255.86028356457600
5_183_uskaataayaapii-h	213.8229266718930
5_201_utimiskumaau-h	149.60469836217200
6_015_kaanichii-h	399.73902620170200
6_025_uskaataayaapii-h	362.50558840719400
6_032_mihtiwikii-h	275.47855860530200
6_042_maaskiniu-h	133.52301121305000
6_044_kishkichaau-h	181.40882417473600
6_081_iischiimaauschii-h	251.45492459054200
6_083_mishkushiu-h	120.16220089846600
6_097_miinaapuu-h	125.04815159163600
6_101_mitihchii-h	141.57368825674900
6_102_shikutaau-h	167.5643167915220
6_124_wiichiyyiyiu-h	117.94473135622200
6_138_siipii-h	197.05003840257200
6_140_aschii-h	247.3419930881130
6_158_waau-h	132.9473748077110
6_163_muushtaa-h	181.74687433320600
6_174_nichishkaatuu-h	151.39128796266600
6_177_uniwii-h	173.60466178025200
6_179_pipaayihtaamuu-h	185.96576153457
6_183_uskaataayaapii-h	251.79045643225300
6_201_utimiskumaau-h	94.15801415933680
Average	201.735373744451

MN word-final vowels

Filename	Duration
5_013_miinaapuu	144.54373986466100
5_014_muushtaa	180.1141940694640
5_041_waau	242.21264873355900
5_046_mitihchii	66.99555130370840

5_047_maaskiniu	165.75646608451200
5_070_uniwii	145.09163907262500
5_072_iischiimaauschii	138.97748368681200
5_141_niwiichiyyiyiu	325.4149232975540
5_148_mihtiwikii	176.72578934252400
5_164_wichii	264.4559137161160
5_167_uskaataayaapii	148.32138041909100
5_180_siipii	109.86256004246300
5_187_shikutaau	145.72454430622700
5_189_miyiu	127.9813859061140
5_192_aschii	190.39755133017700
5_194_kaanichii	191.96370026028500
5_198_mishkushiu	88.417697146413
5_214_uskaataayaapii	216.3920466396700
6_013_miinaapuu	138.34985296101500
6_014_muushtaau	129.28513201505500
6_041_waau	190.65776710791200
6_046_mitihchii	93.36360712009690
6_047_maaskiniu	240.88655750244400
6_070_uniwii	275.569228425026
6_072_iischiimaauschii	177.96946230732800
6_141_niwiichiyyiyiu	128.84247506559000
6_148_mihtiwikii	132.67911373091600
6_164_wichii	287.5858017169370
6_167_uskaataayaapii	271.43606212935500
6_180_siipii	226.2787967815640
6_187_shikutaau	44.10861506659550
6_189_miyiu	60.58683306501720
6_192_aschii	129.38985480324300
6_194_kaanichii	96.195474757498
6_198_mishkushiu	64.56784008531600
6_214_uskaataayaapii	346.78146648475200
Average	169.552309898545

Appendix VII: Average Pitch on Final and Non-Final Vowels

LBS average pitch on final and non-final vowels in words with final affricates / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
1_051_piisimuhkaan-h	ii		179.0715290255950
	aa	175.80316481683100	
1_137_uchaapaanish-h	u	173.97613990888200	
	aa		181.368682002117
	aa	177.71705635133000	
1_154_wiich-h	ii	194.15773214043800	
1_204_kuskusch-h	u		201.5884047345100 0
1_209_kaawaastaanikihc hichaapiyich-h	i	187.54954838609800	
	aa	184.3852702730780	
	i		190.4743545116310
2_051_piisimuhkaanich-h	ii		200.5994542262940 0
	u	183.09310465372300	
	aa	188.6313141704330	
2_154_Wiich-h	ii		152.3685679124600 0
2_204_Kuskusch-h	u		201.5174915043130 0
2_209_kaawaastaanikihc hichaapiyich-h	i	179.38575304787100	
	aa		180.2724367089900 0
	i	172.72528121635100	
Average		181.742436496504	185.907615078239

LBS average pitch on final and non-final vowels in words with final affricates

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_020_kuskusch	u	183.79193820370400	
	u		201.4557845503470 0
1_059_kilwaakis	u	181.8730655980400	
	aa		183.6097486632010 0

	a	144.29585044980500	
1_082_kaawaastaanikihc hichaapiyich	i		204.1985632373780 0
	aa	194.67456850310100	
	i	169.4648786377250	
1_096_wiich	ii		191.3999158878060 203.9527459682450 0
2_020_kuskusch	u		178.5518732068310 0
2_059_Kilwaakis	u		
	a	176.61031021446500	
	a	159.20121541296000	
2_082_kaawaastaanikihc hichaapiyich	i		184.6047376791410 0
	aa		
	i		
2_096_wiich	ii		180.5996156178350 0
Average		172.844546717114	191.046623101348

LBS average pitch on final and non-final vowels in words with final continuants / + h/

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_010_uhkumis-h	u	201.07906967339100	
	u		211.2515939643940 0
1_017_ukishish-h	u	180.47371213970900	
	i		199.3905244386270 0
1_027_muuhkumaanish-h	uu	181.2204081627290	
	u	195.6071205463460	
		197.62627840839600	
	aa		200.5122055990800 0
1_054_paashchishikinish-h	i	194.07515192473700	
	i		200.4226495586410 0
	i	196.21399506740200	

1_073_mitaas-h	i		186.8542119381220 0
	aa	185.25406407130500	
1_112_shiipiishish-h	ii	179.9744291009910	
	ii		198.9173090586300
1_114_mishchikush-h	i		193.2856806924980 0
1_115_utaanis-h	u	173.80520173799700	
	aa		179.4160975986850 0
1_117_miinish-h	ii		192.6034672388670
1_134_iiyiyiukimikush-h	ii	181.89875498854400	
	u	180.14875410580100	
	i		195.2698605277590 0
1_135_usikus-h	u	160.5077709099210	
	i		199.1910070827050 0
1_146_ukusis-h	u	187.4396880181480	
	u		190.6820963085440 0
1_147_mitaas-h	i		157.5624016775840 0
	aa	153.1073836881620	
1_168_uchishkwaachihchi ish-h	u	163.2817830508540	
	aa		194.1850834547460
	ii	123.60143860774000	
1_182_saakihiikinipaakus h-h	i		214.8122180394250
	i	203.8914373212610	
	aa	200.4640955273140	
1_199_wiitimus-h	ii	187.72982955630600	
	i		196.3180058710570
1_212_uchishkwaachihchi ish-h	u	166.9526985552860	
	aa	184.18490605116700	
	ii		194.8015414222840
2_001_muusuyaas-h	uu	200.15705336312600	
	u		217.8215549781760

			0
	aa	182.43027520210100	
2_010_uhkumis-h	u	200.52095628285100	
	u		212.0159131762770
			0
2_017_ukushish-h	u	186.508433229301	
	u		195.5426325783050
			0
2_027_muuhkamaanish-h	uu	175.28117990404600	
	aa		181.363461193743
2_054_paashchishikinish-h	i	194.53835405971800	
	i		200.2172597535510
			0
	i	196.89972562563800	
2_073_mitaas-h	i		178.6111605010520
			0
	aa	178.07598023884500	
2_080_kilwaakis-h	u	177.77368756273500	
	a		180.6448249226600
			0
	a	159.96659309172100	
2_112_shiipiishish-h	ii	178.64977913537200	
	ii		198.5776071870510
			0
2_114_mishchikush-h	i		199.2327270279780
			0
2_115_utaanis-h	u	175.19161292999400	
	aa		178.5287508913600
			0
2_117_miinish-h	ii		176.3949662122090
			0
2_134_iiyiyiukimikush-h	ii		197.5965986668300
			0
	u	187.75732335479700	
	i	194.92782256403300	
2_135_usikus-h	u	161.01659885501700	

	i		199.5189717182750 0
2_137_uchaapaanish-h	aa		179.9976544617110
	aa	178.07937054321400	
	i	--undefined--	
2_146_ukusis-h	u	180.77264563275900	
	u		191.0996660249660
2_147_mitass-h	i		173.9056659423980
	aa	171.03980502109400	
2_182_saakihiikinipaasku sh-h	i		178.9781241364390 0
	i	169.03290928502100	
	aa	178.28581551896400	
2_199_wiitimus-h	ii	184.65843540998000	
	i		206.4731037898440
2_212_uchishkwaachihchi ish-h	u	173.26669530858300	
	aa	165.6254732841470	
	ii		177.4443184304060 0
Average		180.644322147035	192.484469890691

LBS average pitch on final and non-final vowels in words with final continuants

Filename	Segment label	Avg pitch non- accented	Avg pitch accented
1_001_muusuyaas	uu	186.27447966672900	
	u		195.9120561438320
	aa	167.52224216282300	
1_011_muuhkumaanish	uu		194.9440707155950
	aa	192.2087366113240	
1_016_uchaapaanish	u	166.04949311090800	
	aa	182.009580189753	
	aa		182.5892624857580
1_018_muusuyaas	uu	183.00570826447300	
	u		194.2983620305850 0
	aa	162.81421034974900	
1_033_niwiitimus	ii	188.34393395679300	

	i		202.988014419986
1_037_wiyaas	i		188.8129595894280
	aa	149.5834501555140	0
1_038_iiyiyiukimish	ii	182.69571360289300	
	iu	185.32150268191500	
	i		195.674078654562
	i	176.00246057481500	
1_040_nisikus	i	156.5137272469150	
	i		206.2225355001280
	u	204.16661975689700	0
1_058_apis	a		167.1593520041010
1_067_nihkumis			0
	i	197.77321356806300	
	u		205.4981973597030
			0
1_087_miinish	ii		180.2191613804210
			0
	ii		183.9403360974520
1_099_shiipiishish	ii		0
	ii	179.80775534218500	
1_107_mitaas	i		189.3637514065660
	aa	155.69477235523600	
1_109_nitaanis	aa		190.6899477037020
1_120_nikushish	i	165.77461927012900	
	u		177.4238427025530
1_142_paashchishikinish	aa	190.3742837806960	
	i	190.9940702778270	
	i		206.9005153565870
1_144_wiyaas			189.4768086422500
	i		0
	aa	151.96179511380400	
1_151_mitaas	i		150.8221464917210
			0
	aa	143.2215554774270	
1_159_apis	a		190.7674859104910

			0
1_161_nikusis	i	177.61074775908100	
	u		184.5154474651000
			0
1_197_mishchikush	i		207.1458630229280
1_211_saakihiikinipaakush	i		191.7261838072900
			0
	i	176.4215743073980	
	aa	179.39715810209500	
2_011_muuhkumaanish	uu	162.08950985730900	
	aa		188.968660039406
2_016_uchaapaanish	u	172.0653626408750	
	aa		180.618204717778
	aa	176.16480425008600	
2_018_muusuyaas	uu	178.52823694529000	
	u		190.3017096463140
			0
	aa	151.92468818893600	
2_033_niwiitimus	ii	175.63632222161300	
	i		204.6293870777510
			0
2_037_wiyaas	i		177.9913641543270
	aa	148.53021716710100	
2_040_nisikus	i		190.8566828476210
			0
2_058_apis	a		196.3765305315900
			0
2_067_nihkumis	i		183.1231930353250
	u	179.30872909490300	
2_087_miinish	ii		161.4511141514260
			0
2_099_shiipiishish	ii	169.55029326029400	
	ii		180.6704393526320
			0
2_107_mitaas	i		166.8831273102720
			0
	aa	140.15942020427000	

2_109_nitaanis	aa		176.6340641306880 0
2_120_nikushish	i	184.21873230760200	
	u		190.9145664867860
2_142_paashchishikinish	aa	182.5897620909510	
	i	184.4442746395640	
	i		190.4572852704700 0
2_144_wiyaas	i		180.8166121145610 0
	aa	151.61135446462000	
2_151_mitaas	i		151.5369954259460 0
	aa	133.01846058369600	
2_159_apis	a		190.9081981741370
2_161_nikusis	i	177.0386194659110	
	u		185.0388061145010 0
2_168_uschishkwaachihiish	u	159.74214984508700	
	aa		182.2536895048570 0
	ii	126.55497526722800	
2_197_mishchikush	i		206.9797907535240
2_211_saakihikinipaakush	ii		178.4235903164030 0
	i	178.3351094216350	
	aa	161.61998427398800	
Average		170.770542441698	186.812195117373

LBS average pitch on final and non-final vowels in words with final nasals / + h/

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_055_muuhkumaan-h	uu		185.9908474865470
	aa	185.18663092174000	
1_057_mihtihkaan-h	i	178.40298155985000	
	aa		194.724094523551

1_064_usisim-h	u	201.04205861052000	
	i		206.8540713305810 0
1_084_utyiyim-h	u	182.9030461582800	
	i		192.6014567860750 0
	i	185.27073971100000	
1_088_uhkum-h	u	191.21014040994600	
	u		201.4963463199090 0
1_091_chiimaan-h	ii		188.1182014194920
	aa	169.54935911840500	
1_103_paashtaaumiichim h	aa	185.56496389930700	
	ii		190.1754776822480
	i	189.2506782010580	
1_108_uskutimh	u		203.5624065152620 0
	i	192.19351868714200	
1_121_nitaaniskutaapaam -h	u	178.62793469133500	
	aa	180.26032920972000	
	aa		181.3347792644060 0
1_128_utiwaashishiimh	u	85.78543741026910	
	aa		187.8048755280660 0
	ii	191.74464524679700	
1_136_aatiyuuhkaan-h	aa	177.11332280986500	
	uu		183.6944087113310
	aa	180.62168592690000	
1_139_wiichishaan-h	ii	180.3482859414600	
	aa		181.5938309104360
1_143_miichimh	ii	187.6585438672310	
	i		192.6809404161990 0
1_152_pipunikaanh	u	177.99087453918600	
	i	179.4594674946380	
	aa		183.7602690177270

			0
1_165_utaanishkiwishiim-h	aa	202.7403089758650	
	i		204.9187568269160
	ii	202.0915394039580	0
1_190_aaniskiwikinitihchaan-h	i	205.02298082198900	
	i		206.3502379835650
	aa	195.0772064179460	0
1_205_piihtiwipichiwiyaanaan-h	i	185.99577032334100	
	i		189.4916437729590
	aa	179.4539106908990	
1_207_mitutisaanh	i	180.2756083042830	
	u		186.9850532451250
	aa	180.4013713586070	
2_009_aaniskiwikinitihchaan-h	i		196.4495853675530
	i	185.51006644009100	0
	aa	191.56258772621700	
2_055_muuhkumaan-h	uu	183.90229778343100	
	u		187.8400322469060
	aa	180.68359184216000	0
2_057_mihtihkaan-h	aa		184.2259559144780
2_064_usisim-h	u		182.4834165527890
	i	179.04261399005300	0
2_084_utiyiyim-h	u	173.52015078549400	
	i		181.4391287103350
	i	181.29824344069600	0
2_088_uhkum-h	u	181.79958561769800	
	u		186.3545174836270
2_091_chiimaan-h	ii		183.7334066800010
	aa	166.46252103082100	0
2_103_paashtaaumiichim-	aa		188.1247625980460

h			0
	ii	181.56740117770500	
	i	184.4159212462530	
2_108_uskutim-h	u	147.31468883962500	
	u	182.3233665452450	
	i		189.1612622343060
2_118_umushum-h	u	191.6151451722630	
	u		199.4972518542330
			0
2_128_utiwaashishiim-h	u	176.5065563795150	
	aa		178.3588800777980
			0
2_136_aatiyuuhkaan-h	ii	170.97609907406200	
	i	189.24758425547900	
	uu	180.6759870783500	
2_139_wiichishaan-h	aa		192.4393950261010
			0
	ii	191.5309439516850	
2_143_miichim-h	aa		201.5253503513940
			0
2_165_utaanishkiwishiim-h	ii	188.5405056907830	
	i		191.157764979131
2_205_piihtiwipichiwiyaan-h	aa	188.23516971218900	
	i	197.35436902230800	
	ii		199.2261204532380
			0
2_207_mitutisaan-h	i		173.2417230675740
	aa	159.9633032692440	
2_207_mitutisaan-h	i	81.93249080110630	
	u		178.2439068444050
	aa	174.48895730204900	
Average		179.654971488416	190.161147376637

LBS average pitch on final and non-final vowels in words with final nasals

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
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1_003_nitiyim	i		183.8807461269400 0
	i	149.45219196321900	
1_009_aaniskiwikinitihchaan	i		197.4224970446030 0
	i	196.94557334402500	
	aa	92.96601489037930	
1_012_pipunikaan	u		191.4526433574090 0
	i	183.40456926303400	
	aa	146.64842246827900	
1_019_miichim	ii		195.993285131174
	i	157.80499620582700	
1_030_muuhkumaan	uu		187.1219159898030 0
	u	171.7118539305600	
	aa	139.979438925056	
1_031_mihtihkaan	i		182.2327456572580 0
	aa	129.80424607875500	
1_035_paashtaaumiichim	aa		184.8515245993690 0
	ii	175.89008009964800	
	i	141.4558299190930	
1_063_piisimuhkaan	i		212.2928045027320 0
	u	203.04534107997900	
	aa	120.06714823292600	
1_075_niichishaan	ii		181.4112747924660 0
	aa	156.01293507199700	
1_078_mitutisaan	i	183.93423991629600	
	u		195.6728694106790 0
	aa	165.19562945575200	
1_089_nuuhkum	uu		198.3695778822450

			0
	u	153.22031824789600	
1_092_nitiwaashishiim	i		201.177968940058
	aa	189.43899592118100	
	ii	136.2826226390730	
1_095_nitaanishkutaapaa m	u		192.2720352366120 0
	aa	176.61283062365400	
	aa	131.20944836898700	
1_116_chisihiikinaahtikw	ii		201.6604633646510
	i	176.70145626167200	
1_126_nisisim	i	199.14726692051200	
	i	155.18762364496800	
1_127_piihtiwipichiwiyaan aan	i		198.590752293428
	i	195.65694265613000	
	aa	171.66281647997900	
1_162_nitaanishkiwishiim	aa	186.42044264099100	
	i		191.8122559908210
	ii	92.7116231106143	
1_173_uskutim	u		206.2181415878090 0
	i	160.42922253533200	
1_188_chiimaan	ii		188.9152509193780 0
	aa	143.82176259657200	
1_195_nimushum	i		186.1511162452570 0
	u	151.97473177582000	
1_210_aatiyuuhkaan	aa	173.62964408707400	
	uu		181.4066171544640
2_003_nitiyim	i		184.4594990516720 0
	i	151.42494330293000	
2_012_pipunikaan	u	197.27256816468700	
	i	177.33446703204000	
	aa		205.4212651642760 0
2_019_miichim	ii		178.7568755609760

			0
	i	161.11387779752000	
2_031_mihtihkaan	i		187.6938024555850
	aa	144.84222615218300	0
2_035_paashtaaumiichim	aa		180.4459305952600
	aa	174.1560504732260	0
	ii	167.81304411568400	
	ii	182.27908219555500	
2_063_piisimiuhkaan	i		197.5623235497280
	u	187.7885624544750	0
2_075_niichishaan	ii		187.1091663098620
	aa	177.2046828542780	
2_078_mitutisaan	u		185.8858455561190
	uu		0
2_089_nuuhkum	u	154.2323137773180	181.8595000195380
	u	185.60879580263300	
2_092_nitiwaashishiim	aa		192.3623666506750
	ii	159.3481641451670	0
2_095_nitaaniskutaapaam	u		178.5762936138040
	aa	177.22776598124200	
	aa	150.71399673584900	
2_126_nisisim	i		181.9407984548710
	i	88.91235694669310	0
2_127_piihtuwupichiwiyaanaa	i	169.92284081585300	
	i		172.9216227143370
	i	157.6812426793900	0
2_162_nitaanishkiwishiim	aa	182.52035578863900	
	i		186.2246725291850
			0
2_173_uskutim	u		186.7152278174390

	i	155.12767497036900	
2_188_chiimaan	ii		194.3649145843440
	aa	149.95989199109200	0
2_190_aaniskiwikinitihchaan	aa	189.3073060651360	
	i		198.1864023661890
	i	189.92648546163500	0
2_195_nimushum	u		178.9093985335000
2_210_aatiyuuhkaan	aa	178.66979639652800	
	uu		182.7519067952950
	aa	105.75323340972200	0
Average		161.834526050265	189.770623039739

LBS average pitch on final and non-final vowels in words with final plosives /+h/

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_005_mitukihp-h	i	165.13809889554100	
	u		207.5608010437060
1_006_niimaawiniwit-h	ii		188.3258836214130
	aa	182.94073874575900	0
	i	185.50186767282300	
1_007_misinihiikinaachiniwit-h	aa	182.54513312656200	
	i		190.5159322621580
	i	181.13285722854800	
1_022_aamiiukihp-h	ii	184.91711691801200	
	u		185.8245212685480
	i	179.31250065014800	0
1_028_wiisht-h	ii	188.6073899831	
	i		193.6834353186130
1_029_maaschiisk-h	aa	150.06494037333500	0

	ii		159.5318764635930 0
1_036_chaachishaapaaya aukuhp-h	aa		193.8077149612600 0
	aa	187.01195870394000	
	u	193.19386927434900	
1_039_uschikimikw-h	u	181.09112071861300	
	i		210.7376754199800
	i	201.55157564892100	
1_048_waat-h	aa		163.0667687045660 0
1_050_shuwiyaaniwit-h	u	180.60171883628600	
	aa	186.14826652506500	
	i		188.6392608297450 0
1_056_chiskutimaatuukimi kw-h	aa	201.08516189484700	
	uu	201.8951350594170	
	i		205.4859814598180 0
1_060_astaasuukimikw-h	aa	199.17200988860700	
	uu		207.1500241220360 0
	i	206.3167533133220	
1_066_chimuwinikuhp-h	i		212.5220146535710 0
	i	212.20107343582100	
	i	207.88766270095900	
1_068_piishaakinikuhp-h	aa	193.3537194297980	
	i		204.3918312924680 0
	i	198.18493080214300	
1_074_shuwiyaanikimikw- h	i	197.71935220080200	
	i		212.583864209726
	i	206.3663439627800	
1_079_akhup-h	a		191.2880965185500
1_085_uschisk-h	u		170.7875546218980
1_100_wiikhwaayaaukuhp	aa	195.07847316978400	

-h	aa	190.78024176225500	
	u		198.9873500397560
1_110_shiipaachipiyuwik uhp-h	i		203.6823032789530 0
	u	195.22101758670000	
	i	200.3483091402890	
1_111_shiipaachipiyuwiku hp-h	aa	182.23303046345900	
	i		190.4710836958510 0
	u	176.09500602400600	
1_113_chiipiimishtikuwit-h	i		191.3274875370740 0
	u	184.79654417399700	
1_119_panikiik-h	a		157.57037474591
	ii	150.90349339954700	
1_122_nimihtinikaat-h	i		181.1172297513770
	i	175.87705201742600	
	aa	170.74212046093900	
1_129_nimihtinikaat-h	i		194.6729521009410
	i	185.5892831811900	
	aa	139.32876830390800	
1_131_mishtikw-h	i	158.58658399453300	
	i		194.9674927000920
1_132_chiipiikimikw-h	ii	184.45731029081400	
	ii	187.1571009400200	
	i		199.3984303930320 0
1_149_uut-h	uu		174.4593241842110 0
1_155_uwaatinikuhp-h	aa	180.42114007183600	
	i		193.9171964669070 0
1_156_miiwit-h	ii	201.92518367477100	
	i		209.2187069128940 0
1_157_chishaayaakwaapit	aa	189.38687357296800	
	aa		196.224061603677

-h	i	189.6102412330000	
1_170_miichisuukimikw-h	ii	188.0940919295820	
	uu	192.0513041345250	
	i		199.7503901079870
1_171_nipaaukimikw-h	aa	178.3448732996000	
	u	179.1174391578450	
	i		195.8530089086740
			0
1_175_chisihiikinaahtikw-h	ii	183.92593427319000	
	i		200.2273769456630
			0
1_184_miinaahtikw-h	ii	178.4521885210720	
	aa		183.1254072322980
	i	166.46227969180500	
1_191_iiyimiichiwaahp-h	ii	192.25548890405200	
	i		197.9204379693310
			0
	aa	180.71099808506600	
1_200_nisk-h	i		145.8187107850710
			0
1_206_iyik-h	i		161.9323940114920
			0
	i	156.0098647891260	
2_005_mitukihp-h	i	180.52965973021700	
	u		199.0955854992010
2_006_niimaawiniwit-h	aa	182.88425237716600	
	i		185.4451662337770
			0
2_007_Misinihiikinaachiniwit-h	aa	194.38394032869200	
	i		199.2222696421770
			0
	i	196.07157510462600	
2_022_aamiiukihp-h	i	178.79998283460800	
	u		185.3829310099690
			0
	i	169.87760245779000	
2_028_wiiyisht-h	ii		188.1676966756370

			0
	i	182.17246754162600	
	a	155.89833496064500	
2_029_maschisk-h	i		162.0562041046240
			0
2_036_chaachishaapaaya	aa		183.2826263983610
aukuhp-h	aa	174.69659977744400	
	u	177.9593315176470	
	i		195.5012365217820
2_039_uschikimikw-h	i	189.40378488694000	
	i	192.4134488237590	
2_048_waat-h	aa		184.3397326029100
			0
2_050_Shuwiyaaniwit-h	u		182.7079811936310
			0
	aa	173.1721829357050	
	i	175.89512251778100	
2_056_Chiskutimaatuukim	aa	184.0612047759200	
ikw-h	uu		188.2102180598370
			0
	i	184.80899922885100	
2_066_chimuwinikuhp-h	i	179.625418859274	
	u		182.792209297373
	i	179.9502320174320	
	aa	187.52342211277900	
2_068_piishaakinikuhp-h	i		195.2772389065050
			0
	i	183.7969354930270	
2_074_shuwuyaanimikimikw	aa	177.89023167928400	
-h	i	179.8129739583750	
	i		192.4541655289920
			0
2_079_akhup-h	a		190.8718490718840
	u	145.44918567539800	
2_085_uschisk-h	i		150.1033621030760
			0

2_100_wiikhwaayaaukuhp-h	aa		185.6289960898640 0
	aa	180.19132639247300	
	u	185.35758702594400	
2_110_shiipaachipiyuwikuhp-h	i		193.1063408875610 0
	u	190.75191432301500	
	u	182.67344441058000	
2_113_Chiipiimishtikuwit-h	i	177.9764594392090	
	u		188.2683333631560
2_119_panikik-h	a	141.75498122342600	
	i	138.68207545539800	
	i		142.547211713029
2_122_Nimihtinikaat-h	i		187.6049262766050
	i	179.93473222795500	
	aa	179.2107878871100	
2_131_mishtikw-h	i		198.5091446238680
2_132_chiipiikimikw-h	ii	181.15066982674600	
	ii	186.24523140616400	
	i		196.2490822679750
2_149_Uut-h	uu		174.0683587270270 0
2_155_uwaatinikuhp-h	u		181.0020917511610 0
	aa	175.87075011432700	
	i	177.27406083378400	
2_156_Miiwit-h	ii	203.16968249012300	
	i		210.8055596920450 0
2_157_Chishaayaakwaapit-h	aa	173.13842979927900	
	aa		186.2825429457570 0
	i	185.70579876772200	
2_170_miichisuukimikw-h	ii	176.87618992351400	
	uu		188.7261363684410 0
	i	188.00474870387100	

2_171_nipaaukinikw-h	i	188.3304634030750	
	aa	179.92044977075600	
	i		189.7181898611590 0
2_172_chimuwinikuhp-h	i	183.10667367422400	
	u		184.2040310963550 0
	i	177.45550936315400	
2_175_chisihiikinaahtikw-h	ii		188.0601114070880 0
	i	169.38916919616600	
2_176_wiiyisht-h	ii		203.4538161488780 0
	i	154.8867194696910	
2_184_miinaahtikw-h	ii		178.0466274703640 0
	aa	168.2417927289940	
	i	169.34263079406800	
2_191_iiyimiichiiwaahp-h	ii	188.16483622710000	
	ii		200.3370584027820 0
	aa	175.13495925157600	
2_200_nisk-h	i		157.7700266119190 0
2_206_iyik-h	i	136.24282457781000	
	i		136.2958021592870
2_208_mishtikuwit-h	u		126.5010942184360 0
Average		181.218540759802	186.738390690207

LBS average pitch on final and non-final vowels in words with final plosives

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_004_uut	u		192.14043885979400
1_021_uwaatinikuhp	u	167.68662184067100	
	aa		182.75031078876200

	i	179.52825997998700	
1_023_mitukihp	i	167.60831677898800	
	u		179.2874877514850
1_024_miiwit	ii		182.27845262832400
	i	153.42160263116300	
1_026_chaachishaapaaya aukuhp	aa		186.86741227480900
	aa	181.89732708335400	
	aa	171.85835808047300	
1_034_uschikimikw	u	159.52641723496800	
	i	187.199063028516	
	i		201.34341316282000
1_043_waat	aa		180.66792555082100
1_045_iitaamiskimikw	ii	166.20590924063200	
	aa	179.2687974383200	
	i		189.0903962794620
1_049_chiipiikimikw	ii	182.65787394986900	
	ii		186.9083558428160
	i	184.18715857850100	
1_052_akhup	a		196.9858383326660
1_053_misinihiikinaachini wit	aa	198.28718602492500	
	i		210.61812967908300
	i	180.92903377993800	
1_061_wiikhwaayaaukuh p	aa		207.62801991997000
	aa	195.1713897989760	
1_062_iiyimiichiwaahp	i	204.03362881686100	
	ii		206.98706041718500
	aa	159.53466812281200	
1_069_miinaahtikw	ii		182.97697840403000
	aa	181.71153206656700	
1_071_piishaakinikuhp	aa	190.44861709193400	
	i		199.63308232075300
	i	179.07811565634900	
1_094_shuwiyaaniwit	u		185.71687740783400
	aa	180.95392163979700	
	i	173.07191176062800	
1_098_aamiiukihp	aa	187.59207143526600	
	ii		198.07046643460600
	u	185.2286543333570	
1_104_chishaayaakwaapi	aa		182.09725761652400
	aa	180.26537555229700	

t	aa	180.39690616170900	
1_123_nipaaukimikw	i	183.55612872550400	
	aa		185.9771506175440
	i	183.2333793601150	
1_145_miichisuukimikw	ii	190.03265538965100	
	uu	190.35480575912600	
	i		193.79096270830000
1_166_mishtikw	i		180.60274324495900
	i	170.86534678168400	
1_169_niimaawiniwit	aa		183.1199704570280
	i	179.0782970765940	
	i	155.12540888558800	
1_172_chimuwinikuhp	i	189.97367909729700	
	u		199.91182408016500
	i	191.40923736888700	
1_176_wiisht	ii		180.83542659472700
	i	161.85918729095500	
1_178_astaasuukimikw	aa	177.72866076450900	
	uu		190.80525226722700
	i	185.94827029454500	
1_185_shuwiyaanikimikw	aa	182.53323196700800	
	i	183.77986010495100	
	i		193.22870486404100
1_193_chiipiimishtikuwit	i		181.64999503318800
	u	171.3305003351610	
1_196_chiskutimaatuukimikw	aa	184.4761835083540	
	uu		190.83195575439300
	i	179.83114549191100	
1_208_kishkichaau_mishtikuwit	i	152.53926370810300	
	u		174.58977322124800
2_004_uut	uu		195.8064735186280
2_021_uwaatinikuhp	aa		178.64277108433500
	i	173.60570437409700	
2_023_mitukihp	i	180.1142923934000	
	u		191.61122772039000
2_024_miiwit	ii		183.8050805707510
	i	150.48021718835600	
2_026_chaachishaapaayaakuhp	aa		189.35167221879600
	aa	187.3277409962110	
	aa	171.68390219522700	

2_034_uschikimikw	i		196.22344679467500
	i	186.8345252333790	
2_038_iiyiyiukimikw	ii	179.47815259154900	
	u	174.60187324764900	
	i		181.30467021919600
2_043_waat	aa		170.82248128872700
2_045_iitaamiskimikw	ii	179.08420558581200	
	aa		185.8713068479860
	i	182.67472116820000	
2_049_chiipiikimikw	ii		192.27341672545400
	ii	179.35867203099500	
	i	185.3249427608720	
2_052_akuhp	a		181.8408797539120
2_053_misinihiikinaachini wit	ii		193.57079234314100
	aa	183.02870578927700	
	i	164.53754785854400	
2_060_astaasuukimikw	aa	184.283306966166	
	uu	191.4520140961290	
	i		197.63778204043400
2_061_wiihkwaayaaukuh p	ii	179.7753288412410	
	aa		180.6585215195490
	aa	175.07134514719300	
2_062_iiyimiichiwaahp	i	194.12176145112700	
	ii		196.5301959871820
	aa	151.10810127250800	
2_069_miinaahtikw	ii		185.36401993752100
	aa	184.6408153651020	
2_071_piishaakinikuhp	ii		179.67459582730600
	aa	178.4405405466280	
	i	170.42975891981100	
2_094_shuwiyaaniwit	u		176.1828987985010
	aa	172.5380468339450	
	i	165.67579775077500	
2_098_aamiiukihp	aa		182.7748029266730
	ii	179.31024712425000	
	u	177.51165391803700	
2_104_chishaayaakwaapi t	aa	172.0819112385600	
	aa	170.26474241748300	
	aa		175.5902251475590
2_111_shiipaachipiyuwiku	aa	186.83887731360500	

hp	i		189.46686290684500
	u	182.4703549718270	
2_116_chisihiikinaahtikw	ii		183.17813564327700
	i	175.46342782823600	
2_123_nipaaukimikw	aa	173.13716639696000	
	u	177.3222063357410	
	i		181.31134376743400
2_129_nimihtinikaat	i		195.09210312685600
	i	184.49086487443500	
	aa	140.55907921157200	
2_145_miiichisuukimikw	ii	183.40961116387100	
	uu	186.7887912716220	
	i		194.43978019025200
2_166_mishtikw	i		149.16402168286200
2_169_niimaawiniwit	aa		173.98389266702700
	i	168.37234408874400	
	i	165.36164855254200	
2_178_astaasuukinikw	a	170.97405518771800	
	uu		183.08469452851300
	i	169.54318728137700	
2_185_shuwiyaanikinikw	aa	178.93666515839500	
	i		182.30018129784400
	i	178.20411058040600	
2_193_chiipiimishtikuwit	i		180.4992407297050
	u	169.5623757630440	
2_196_chiskutimaatuukimikw	aa	177.6929434163260	
	uu		181.8833179616720
	i	181.03268871566900	
Average		177.433021246499	186.955541638126

LBS average pitch on final and non-final vowels in words with final vowels /+h/

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_002_piskustihchaau-h	u		175.7575882246190
	aa	144.2746245254030	
1_015_kaanichii-h	aa		191.0262485625570
	ii	172.56619657415900	0

1_025_uskaataayaapii-h	aa		174.9095789277330 0
	aa	173.76007853794300	
	ii	163.37912281263100	
1_032_mihtiwikii-h	i		198.7928532072080 0
	ii	189.39652920192900	
1_042_maaskiniu-h	aa	179.03333287923200	
	i		197.1883844659040
	i	173.89719305662100	
1_044_kishkichaau-h	i	176.0871645076840	
	aa		176.1455601799800 0
	u	156.76076483434700	
1_076_miyiu-h	i		196.9916189420790
	u	179.89706949584800	
1_077_wichii-h	i		177.5290601058740 0
	ii	174.26600436017000	
1_081_iischiimaauschii-h	aa	196.8522921899350	
	u		200.3930581854100 0
	ii	186.2786047322210	
1_083_mishkushiu-h	i		191.7487073772480 0
1_097_miinaapuu-h	ii	187.1692421740800	
	aa		191.1618912217230 0
	uu	188.2024080149680	
1_101_mitihchii-h	i	183.69664261462700	
	ii		191.5792641707180 0
1_102_shikutaau-h	u		196.2604827433510 0
	aa	176.77645628047700	
	u	169.12608953763100	
1_125_uschihtaasiu-h	u	185.67690008841600	

	aa		197.2190363861130 0
	u	118.0085466636890	
1_133_upishtaahuyuu-h	aa	193.20654332440800	
	u		208.9531261946460
	uu	174.9793284553490	
1_138_siipii-h	ii		187.5186817211820
	ii	180.36078111553900	
1_140_aschii-h	ii		181.5183519985260
1_158_waau-h	aa		179.2306017561560 0
1_163_muushtaa-h	uu		181.5593454262800 0
	aa	180.55350671495000	
1_174_nichishkaatuu-h	i	179.51048073073200	
	aa		201.3580776909060
	uu	191.49744961381900	
1_177_uniwii-h	u		200.1028461626110 0
	i	193.60417391996800	
	ii	166.13181785408700	
1_183_uskaataayaapii-h	aa	177.67250674434800	
	aa	177.91214152227900	
	ii		185.9999376724070 0
1_201_utimiskumaau-h	u		195.6268759856310 0
	aa	186.36580476563500	
	u	180.93768397753400	
1_202_uchischiwaahiicha au-h	ii		178.6080781175140
	aa	170.73351212543900	
	u	171.8789237917610	
1_215_chuuchuu-h	uu		180.3142123886690 0
	uu	173.51388290844100	
2_015_kaanichii-h	aa		182.4881019504750 0

	ii	180.27251878935500	
2_032_mihtiwikii-h	i		194.2884140118330
	ii	180.42056836182900	
2_042_maaskiniu-h	aa	185.04375002928600	
	i		199.1224667315520
	u	173.39276040637200	
2_044_kishkichaau-h	i		185.4913498490000 0
	aa	178.67290025473200	
	u	165.34056709922700	
2_076_miyiu-h	ii		177.530247386604
	u	159.7703507039870	
2_077_wichii-h	i		177.6302147370990
	ii	158.7059731131770	
2_081_iischiimaauschii-h	ii		197.1953985856150 0
	aa	178.82051467091900	
	ii	175.53414621109800	
2_083_mishkushiu-h	i		175.592153882752
	u	172.02391240413000	
2_097_miinaapuu-h	ii	180.5366079712050	
	aa	183.45887250204800	
	uu		184.3448195613580 0
2_101_mitihchii-h	i	174.20497953896100	
	ii		190.8434259738010
2_102_shikutaau-h	i		187.9214905124460
	aa	179.11104143317200	
	u	169.30046866306300	
2_124_wiichiiyiyiu-h	ii		180.3630393246020 0
	ii	176.82112617542200	
	u	170.73154370617600	
2_133_upishtaahuyuu-h	aa		189.4749557875590
	u	189.25418553232800	
	uu	152.94562843226500	
2_138_siipii-h	ii		182.2328969731150 0

	ii	174.92856479353800	
2_140_aschii-h	ii		190.8638458791920 0
2_183_uskaataayaapii-h	aa		163.4016043636660 0
	aa	163.19088098174900	
	ii	154.27012595787300	
2_201_utimiskumaau-h	u		180.4793743933360
	aa	174.6384744672600	
	u	175.28576202886000	
2_202_uchuschiwaahiicha au-h	u		184.9359289339050 0
	ii	183.54462644769000	
	aa	170.17612840508800	
2_203_nichishkaatuu-h	u	177.9104688543260	
	aa		180.6601380284290
	uu	178.03025598250000	
2_215_chuuchuu-h	uu		181.2089456839790 0
	uu	171.12548146775600	
Average		175.09887670818	187.190272897008

LBS average pitch on final and non-final vowels in words with final vowels

Filename	Segment label	Avg pitch non-accented	Avg pitch accented
1_013_miinaapuu	ii		179.9638630078100 0
	aa	178.05441839727000	
	uu	174.219507217228	
1_014_muushtau	uu		174.7099738816340 0
	aa	96.37848452812960	
1_041_waau	aa		154.6902813875170 0
1_046_mitihchii	i		196.8508095175960 0

	ii	112.18121704700000	
1_047_maaskiniu	aa		197.1312755601570 0
	i	191.23350430201500	
	i	126.12667551195200	
1_070_uniwii	u		195.1579604288350 0
	i	182.6638362471830	
	ii	142.7630319214520	
1_072_iischiimaauschii	aa	200.46378838055200	
	u		204.0055689062150
	ii	145.9022829244980	
1_106_chuuchuu	uu		186.2932994847160 0
	uu	150.14394099277600	
	i	191.62151843448100	
1_141_niwiichiyyiyiu	ii		192.6371021822810 0
	u	149.94638363739300	
1_148_mihtiwikii	i		188.5237607675990 0
	ii	129.74918482023200	
1_150_utimiskumaau	u		203.6865952921760 0
	aa	159.08036354734700	
	u	120.82896748000500	
1_153_uchischiwaahiicha au	aa	192.00225680788100	
	ii	177.6406609188930	
	aa		226.8321052222850 0
1_160_upishtaahuyuu	aa		202.3232430980370 0
	u	188.64638435974300	
	uu	133.09428002635000	
1_164_wichii	i		189.1215546858320 0
	ii	144.2258865708120	

1_167_uskaataayaapii	aa		174.920019761221
	aa	161.2591847255180	
	ii	104.83128746842700	
1_180_siipii	ii		210.5372817852560 0
	ii	136.18305893250200	
1_181_piskustihchaau	aa	241.01626478509000	
1_187_shikutaau	i		178.2294693963080 0
	u	177.06717695190300	
	aa	137.36413228063900	
1_189_miyiu	ii		188.6105571778260 0
	u	130.69872658369600	
1_192_aschii	a		188.2719192833090 0
	ii	137.77310687242800	
1_194_kaanichii	aa		187.5256292670120 0
	ii	131.3614738586300	
1_198_mishkushiu	u		156.4148433911290
1_213_uschihtaasiu	u	183.326316503036	
	aa		191.9656735667310 0
	u	89.92524152457520	
1_214_uskaataayaapii	aa		162.4476635359430 0
	aa	153.8960065527320	
	ii	87.32338737956450	
2_002_piiskustihchaau	u		193.2779751574460 0
	aa	181.24265755395100	
2_013_miinaapuu	ii		180.0143400494290 0
	aa	177.92490428232800	
	uu	173.90450779324700	
2_014_muushtaau	uu		180.2710340535640

			0
	aa		
2_041_waau	aa		162.665731758489
2_046_mitihchii	i		180.8420613941390
	ii	117.1948611095760	0
2_047_maaskiniu	aa		181.4126972220350
	i	179.41895273488300	0
	i	130.60397416473000	
2_070_uniwii	u		190.4925345771630
	i	180.04835959336800	0
	ii	146.4494374861600	
2_072_iischiimaauschii	ii		188.6762887136150
	aa	183.9805885654970	0
	ii		
2_106_chuuchuu	uu		170.6037709384390
	uu		
2_125_uschihtaasiu	u	179.96115340581000	
	aa		181.1671656410230
	u	123.2489597674050	0
2_141_niwiichiiyiyiu	ii		185.8388471247210
	ii	183.65450782157300	0
	i	160.66022345750500	
2_180_siipii	ii		180.8177039702320
	ii	131.00119976882600	
2_181_piskustihchaau	aa		146.3591331057240
2_187_shikutaau	i		170.6791705287770
	u	167.326254155563	
	aa		
2_189_miyiu	i		172.4131469846270
	u	79.82977760951110	0

2_192_aschii	a		193.7902971839600 0
	ii	132.22872582702800	
2_194_kaanichii	aa		170.5963578233500
	ii	127.90646257706200	
2_198_mishkushiu	i		182.6145297128470 0
2_213_uschihtaasiu	u	181.89548073229800	
	aa	188.3197651770360	
	u		289.0859099444900 0
2_214_uskaataayaapii	aa		177.2089940261780 0
	aa	166.63128612757200	
	ii	156.5465598304980	
Average		153.731616750596	186.271584662737

JN average pitch on final and non-final vowels in words with final affricates / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_051_piisimuhkaanich-h	ii	131.01661132759700	
	u	143.70724868029100	
	aa		147.5022953081690 0
3_204_kuskusch-h	u		142.3049815240380
3_209_kaawaastaanikihc hichaapiyich-h	i	117.51277251308900	
	aa	124.81310815780100	
	i		129.8946585474500 0
Average		129.262435169694	139.900645126552

JN average pitch on final and non-final vowels in words with final affricates

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_020_kuskusch	u		172.8923674304470 0
3_082_kaawaastaanikihc	i	118.76016682512800	
	aa	114.15768646966300	

hichaapiyich	i		138.3469741042730 0
3_096_wiich	ii		131.3560478099640 0
Average		116.458926647396	147.531796448228

JN average pitch on final and non-final vowels in words with final continuants /+h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_010_uhkumis-h	u	140.04377195953000	
	u		166.7279837063130 0
3_017_ukushish-h	u	138.12225761805700	
	u		168.0665354204130 0
3_027_muuhkamaanish-h	uu	148.12140107585200	
	u	160.6236253753310	
	aa		165.6447720407810 0
3_054_paashchishikinish-h	i	138.1716443347460	
	i	139.2680620422320	
	i		157.5285575344190
3_073_mitaas-h	i		129.5105221329060
	aa	127.01565303095200	
3_112_shiipiishish-h	ii	143.55531773704300	
	ii		152.3867992822200 0
3_114_mishchikush-h	i	121.02139179649500	
	i		155.1460150833310 0
3_115_utaanis-h	u	130.76132734044100	
	aa		146.1210582024000 0
3_134_iiyiyiukimikush-h	u	143.31339246224000	
	i		144.2710864254400
	i	125.65152319628900	
3_135_usikus-h	u	116.25422890324000	
	i		162.0918335593060 0
3_137_uchaapaanish-h	u	119.09201969227100	
	aa	114.10738778679700	
	aa		137.349111843664

3_146_ukusis-h	u	132.10145303792400	
	u		156.2698273830440 0
3_182_saakihiikinipaasku sh-h	ii	139.73412964593800	
	i		145.5802016403680 0
	aa	137.73204433101400	
3_199_wiitimus-h	ii	132.7824688429320	
	u		140.2320881647670
3_212_uchishkwaachihch iish-h	a	134.2457795793960	
	aa		145.46114683688300
	ii	85.4205755004519	
Average		131.768545489961	151.492502617084

JN average pitch on final and non-final vowels in words with final continuants

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_011_muuhkumaanish	uu	143.73043990951700	
	u		157.4980332833500 0
	aa	143.20853403066700	
3_016_uchaapaanish	a	137.43125704644300	
	aa	134.33127957129800	
	aa		147.0584222007800 0
3_018_muusuyaas	uu	127.58017125906400	
	u		142.0757620429190 0
	aa	106.50655001406700	
3_033_niwiitimus	i	157.23823350342200	
	i		168.5600225660360
3_040_nisikus	i		155.4034784420520 0
3_067_nihkumis	i	137.03097164735700	
	u		146.1724133715470 0
3_087_miinish	uu		165.3437106702880
3_099_shiipiishish	ii		163.0528796329870 0
	ii	160.4695249585070	
3_107_mitaas	i	117.22451342629900	
	aa		146.2493307054010
3_109_nitaanis	aa		129.2768159285910

			0
3_120_nikushish	i	144.45547726459500	
	u		149.4135810200440
			0
3_142_paashchishikinish	i	126.66836287118200	
	i	138.35004837506000	
	i		143.8874687750610
			0
3_144_wiyaas	i	115.88494461753200	
	aa		131.0784952638240
3_151_mitaas	i		113.1649988486250
	aa	89.35658208381310	
3_159_apis	a	136.0943861723190	
	i		152.5261753191240
			0
3_161_nikusis	i	136.32296377046600	
	u		149.0452109620380
3_168_uschishkwaachihi hiish	u	140.83323620160000	
	aa		149.2547568581170
	ii	94.80697848330950	
3_197_mishchikush	i	118.31725133361800	
	i		156.5413373441050
3_211_saakihiikinipaakus h	ii	133.2194314634510	
	i	133.33861358207400	
	aa		136.7723678446030
			0
Average		130.563625072075	147.493434793657

JN average pitch on final and non-final vowels in words with final nasals / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_009_aaniskiwikinitihcha an-h	i	146.01441569138100	
	i		151.508428957036
	aa	132.1475813169390	0
3_055_muuhkumaan-h	uu	132.72287354579200	
	u	136.89602331040500	
	aa		153.120493988182
			0
3_057_mihtihkaan-h	i	138.59148199100400	

	aa		154.147871744502 00
3_084_utiyyim-h	u	124.35200697267100	
	i	160.58944087413500	
	i		169.407825979900 00
3_088_uhkum-h	u	129.10592653986300	
	u		167.853903092175 0
3_091_chiimaan-h	ii		150.831487426959 00
	aa	132.7291150568580	
3_103_paashtaaumiichim-h	aa	122.82201884786700	
	ii	117.4566160629910	
	i		138.336470922127 00
3_108_uskutim-h	u	111.49520209216000	
	u	124.95237693597400	
	i		154.080408191910 00
3_118_umushum-h	u	126.52807376220100	
	u		159.632810069538 00
3_128_utiwaashishiim-h	i		124.233387355548 00
	aa	122.47719675164500	
	ii	108.2287536220750	
3_136_aatiyuuhkaan-h	aa	113.15484891812900	
	uu	110.08597068065500	
	aa		146.91942825771
3_139_wiichishaan-h	ii		152.236671178068 00
	aa	139.12400147675600	
3_143_miichim-h	ii	118.91939025489100	
	i		151.832380279820 0
3_165_utaanishkiwishiim-h	aa		134.321826685858 00
	i	131.33501790155200	
	ii	131.94627529573400	
3_205_piihtiwipichiwiyaan-h	u		144.352559073101 00
	aa	139.66407800541700	

	aa	130.88640211046800	
3_207_mitutisaan-h	i	125.798751094683	
	u		147.443654300360 00
	aa	97.30930735387520	
Average		127.128197941005	150.016225468925

JN average pitch on final and non-final vowels in words with final nasals

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_003_nitiyim	i	132.031278581205 00	
	i		176.090390544853 0
	i	140.904718890522 00	
3_019_miichim	ii		153.063440947589 00
	i	101.674193188211 0	
3_031_mihtihkaan	i		159.328143295135 00
	aa	103.333763565841 00	
3_035_paashtaaumiichim	aa		144.248792921343 0
	ii	141.813279003445 0	
	i	112.517339144133 00	
3_063_piisimiuhkaan	ii	120.908496592460 00	
	i		141.012523644700 00
	aa	95.7091106775266 0	
3_075_niichishaan	ii		181.645600700864 00
	aa	108.387197801910	

		00	
3_078_mitutisaan	i	133.620650493169 0	
	u		163.700104380073 00
	aa	92.7119459806939 0	
3_089_nuuhkum	uu		198.989997434960 0
	u	93.2640344562892 0	
3_092_nitiwaashishiim	i	141.599701072680 00	
	aa		147.627738893414 0
	ii	95.1132455851822 0	
3_095_nitaaniskutaapaam	u	156.654739658169 00	
	aa		159.921611745741 00
	aa	93.9376767316209 0	
3_127_piihtuwupichiwiyaanaa	u	119.517611875218 0	
	aa		153.711210159309 00
3_162_nitaanishkiwishiim	aa	129.468101209331 00	
	i		137.050765471268 00
	ii	92.2774226590235 0	
3_173_uskutim	u		144.203791992350 00
	i	105.807195478730 00	
3_188_chiimaan	ii	116.153244184873 00	
	aa		124.638646172525

			00
3_190_aaniskiwikinitihchan	aa	122.904647617663	
		00	
	i		164.609971939865
			0
3_195_nimushum	aa	87.4417249028577	
	i	129.970195405014	
		00	
	u		146.291914402336
			00
3_210_aatiyuuhkaan	aa	121.981706082001	
		00	
	uu	124.948822815418	
		0	
	aa		130.930432509803
			00
Average		115.948155525123	154.533239832713

JN average pitch on final and non-final vowels in words with final plosives / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_005_mitukuhp-h	i		163.7882479130740
	u	159.40080186153200	0
3_006_niimaawiniwit-h	ii	147.22955798908600	
	aa		153.4893571840650
	i	123.25100615359000	0
3_007_misinihiikinaachiniwit-h	i		160.6639662233270
	aa	150.90512089796100	0
	i	128.40233494153900	
3_028_wiyyisht-h	ii	135.2904919483870	
	i		173.6107683314350
3_029_maschisk-h	a	136.7837688057020	
	i		137.2630080868000
			0

3_036_chaachishaapaaua aukuhp-h	aa	144.26428300643400	
	u	138.15685013477200	
	u		150.5601069553180 0
3_039_uschikimikw-h	u	135.2532141185680	
	i	133.66751899727800	
	i		151.5551633055630 0
3_048_waat-h	aa		138.7085002509300 0
3_050_shuwiyaaniwit-h	i	133.16793023306200	
	aa	126.93420236718000	
	i		172.6438867437140 0
3_056_chiskutimaatuukim ikw-h	uu	129.7459925717950	
	aa	147.6632699517340	
	i		188.2943067413800
3_066_chimuwinikuhp-h	i	127.55250934653300	
	i		128.0484670874260 0
	i	123.55456580566400	
3_068_piishaakinikuhp-h	aa		137.2215864919630 0
	i	136.50133156572400	
	i	136.0407234410300	
3_074_shuwuyaanimikw -h	aa	154.50140315767900	
	i	152.0002714451470	
	i		155.6220342217350 0
3_079_akhup-h	a		141.0742739479140
3_085_uschisk-h	u	128.58563727958800	
	i		142.9384368943780 0
3_100_wiikhwaayaaukuh p-h	aa	151.59366643857800	
	aa		155.6258606360170 0
	u	126.10233057739100	

3_110_shiipaachipiyuwiku hp-h	i	120.99403712073200	
	i		122.2250767475480 0
	u	111.32345660843400	
3_113_mishtikuwit-h	i	120.53280239800200	
	i		150.9853533250930 0
3_119_panikik-h	a	126.63350138452400	
	i	125.64882581859900	
	i		138.2401972717370 0
3_131_mishtikw-h	i	120.97651606922000	
	i		137.3975060992300 0
3_132_chiipiikimikw-h	u	119.07337370471600	
	i		141.8692945767770 0
	i	118.31251315662200	
3_149_uut-h	uu		139.3237969460680 0
3_155_uwaatinikuhp-h	aa	130.13791182050600	
	i		133.1309845007820
	i	123.611888351722	
3_156_miiwit-h	ii		151.6302887333890 0
	i	128.73221522116100	
3_157_chishaayaakwaapi t-h	aa		135.9159556203010 0
	aa	133.10943338121500	
	i	128.39114508147800	
3_170_miichisuukimikw-h	ii	126.81580808249700	
	uu	142.61438081679000	
	i		153.2975568693230
3_171_nipaaukinikw-h	aa	132.44439657532000	
	i	137.97500553084600	
	i		141.3977996346810 0

3_184_miinaahtikw-h	ii		125.6260839355410 0
	aa	122.13832033767000	
	i	121.66722731074600	
3_200_nisk-h	i		125.6206103874930 0
	i	121.33734112939700	
	i	114.78816799884700	
3_iiyimiichiiwaahp-h	ii	132.45369066801100	
	i		145.3719312961010 0
	aa	116.25146457582500	
Average		131.542812897422	146.438013565303

JN average pitch on final and non-final vowels in words with final plosives

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
3_004_uut	uu		150.8712170893830 0
3_021_uwaatinikuhp	aa	125.87884230178300	
	i	132.98112681036100	
	i		146.1540758836980 0
3_023_mitukihp	i	145.082043929377	
	i		177.5449802945480 0
3_024_miiwit	ii		177.2028715083580
	i	127.06600251145300	
3_026_chaachishaapaaya akuhp	aa		143.7826219256040 0
	aa	138.1662605589130	
	aa	133.6460551721270	
3_034_uschikimikw	u	137.22823847823000	
	i	153.18181232685800	
	i		175.3497993994190
3_038_iiyiyiukimikw	uu	138.39340082232200	

	u	148.55376240082800	
	i		155.2139183308730
3_043_waat	aa		144.8833680255040
3_045_iitaamiskimikw	ii	119.27641640402000	
	aa	129.29049224194900	
	i		147.8398556325630
3_049_chiipiikimikw	ii		157.2749934795790
	u	145.7942809869560	0
	i	155.12396651303600	
3_052_akhup	a		143.7710410922630
3_053_misinikiikinaachini wit	aa	128.7210677275050	0
	i	125.57889657587700	
	i		159.7661991856470
3_061_wiikhwaayaaukuh p	aa		128.7291839131430
	u	124.01382925933100	0
	u	98.10284025172620	
3_062_iiyimiichiwaahp	ii		122.4973500391810
	i	122.39209193067700	0
	aa	89.76732432458110	
3_069_miinaahtikw	ii		136.8116480193370
	aa	134.14673212450200	0
	i	102.57485826130800	
3_071_piishaakinikuhp	aa	140.55214479800600	
	i		148.1421385512230
	i	138.245760999504	0
3_094_shuwiyaaniwit	u		135.0006875790710
	aa	133.50101230498900	0
	i	111.35479439032500	
3_104_chishaayaakwaapi	aa	121.78375013953900	
	aa	120.48628327054700	

t	i		150.310692219308
3_111_shiipaachipiyuwiku hp	i	90.14314519991520	
	i	106.8237773958790	
	u		148.8362551183040 0
3_123_nipaaukimikw	aa	124.92093753910600	
	i	143.30379297416800	
	i		183.6590937548300 0
3_129_nimihtinikaat	i	125.93481371108300	
	u		138.4647493913560
	aa	94.90079221559930	
3_130_iyik	i		155.7399506296130
	i	119.58657067749500	
3_145_miichisuukimikw	uu	114.22049731622900	
	i	144.75943141074700	
	i	171.50154687202900	171.5015468720290 0
3_166_mishtikw	i		147.5807072663970
	i	94.43358315323210	
3_169_niimaawiniwit	ii	142.35283243127900	
	aa	150.80665696070300	
	i	97.86066954763410	
		277.32899958313400	277.3289995831340 0
3_172_chimuwinikuhp	i	126.91854287247900	
	i		136.935525102603
	i	134.8393903195990	
3_176_wiisht	ii		133.5121959315200 0
	i	112.16340700754100	
3_185_shuwiyaanikinikw	aa	143.06401365368500	
	i		145.8255908339590 0
	i	137.8773890239260	
3_193_chiipiimishtikuwit	i	112.61793751344600	
	i	112.18979406508000	
	u		151.8866183893240

			0
3_196_chiskutimaatuukim ikw	uu	111.54828165695600	
	i	131.68422671951100	
	i		163.1452096936770
3_208_mishtikuwit	i		115.9322337576360
			0
	u	111.6632915680540	
Average		129.326951117078	153.919203822358

JN average pitch on final and non-final vowels in words with final vowels / + h/

Filename	Segment label	Avg. pitch non- accented	Avg. pitch accented
3_015_kaanichii-h	aa		158.10940303083100
	ii	110.36075052054900	
3_025_uskaataayaapii-h	aa	141.2867104685350	
	aa	135.0926540556310	
	ii		176.67502286297200
3_032_mihtiwikii-h	i		174.06559512581000
	ii	148.03638306698900	
3_042_maaskiniu-h	aa	139.3650386914340	
	i	146.1081419308140	
	u		181.1823190171910
3_076_miyiu-h	i		151.79213104840300
	i	115.01790692927200	
3_077_wichii-h	ii	114.03906621584000	
	ii		139.3103933543540
3_081_iischiimaauschii-h	ii		130.852737580894
	aa	121.27183318647100	
	ii	119.11664329248700	
3_083_mishkushiu-h	i		158.8370161823060
	u	141.6314679753090	
3_097_miinaapuu-h	ii	134.35976056047300	
	aa		152.38886254665100
	uu	78.9130609932677	
3_101_mitihchii-h	i	143.83778193824200	
	ii		165.14777165086000
3_102_shikutaau-h	u	151.30523745146000	
	aa	155.84238971073300	

	u		175.09382794385800
3_124_wiichiyyiu-h	aa	166.3315789253220	
	ii		168.4382051707630
	u	115.65789727135400	
3_138_siipii-h	ii	121.1368198213670	
	ii		156.62045473532100
3_140_aschii-h	a		135.92748454930500
	ii	132.65210970249000	
3_158_waau-h	aa		131.26149904496100
3_163_muushtaa-h	uu		135.33348943087400
	aa	80.32786601795980	
3_174_nichishkaatuu-h	aa		129.52110789374000
	uu	106.72229987344200	
3_177_uniwii-h	u	131.6364853088410	
	i	127.71853153708000	
	ii		152.5513114452190
3_183_uskaataayaapii-h	aa		124.89089733767700
	aa	121.50442398219300	
	ii	110.32426350215400	
3_201_vowel-h	i	136.96572880260200	
	a		139.58157626090200
	i	100.2418522241150	
3_202_uchuschiwaahiich aau-h	i		132.429243093018
	aa	112.51631791790400	
	aa	93.47800116571170	
Average		125.093300101335	150.952873776472

JN average pitch on final and non-final vowels in words with final vowels

Filename	Segment label	Avg. pitch non- accented	Avg. pitch accented
3_013_miinaapuu	ii	151.2739752517630	
	aa		161.65122424037700
	uu	97.02519795595480	
3_014_muushtaa	uu		177.15002483545800
	aa	95.52915763559430	
3_041_waau	aa		109.50050285648500
3_046_mitihchii	i	137.9725394901340	
	ii		165.3305915121570
3_047_maaskiniu	aa	127.10566396266300	

	i	131.97040504361400	
	u		167.31293594991000
3_070_uniwii	u		188.4011889424210
	i	161.718545861164	
	ii	95.59901649647380	
3_072_iischiimaauschii	ii		158.39270854681000
	aa	157.8303502570080	
	ii	91.40260232936490	
3_125_uschihtaasiu	i	122.40939370516200	
	i		132.41612530226700
	i	96.51320439089060	
3_141_niwiichiyyiyiu	i	125.12053064735600	
	ii		142.76085870900800
	u	93.56960253765530	
3_148_mihtiwikii	i	120.26458969520900	
	i		159.4391711890950
	ii	98.25760793502940	
3_150_vowel	a	132.42339674901600	
	a		150.06095103688400
	i	99.53213638417940	
3_153_uchischiwaahiicha au	i		128.29641832509000
	a	111.68477972629700	
	aa	112.86548674199200	
3_164_wichii	i		164.5336418722800
	ii	126.49471626541100	
3_167_uskaataayaapii	aa		134.38438032264900
	aa	132.38124603607900	
	ii	101.56353619804700	
3_180_siipii	ii		149.0697117017720
	ii	105.67068680406200	
3_181_piskustihchaau	i	141.02891470846900	
	u		162.2107510835770
	aa	83.05783798597690	
3_187_shikutaau	u	115.30379585751600	
	aa	129.3958358992140	
	u		168.42399089147500
3_189_miyiu	i	125.51123223539100	
	u		163.02516858618600
3_192_aschii	a		136.96283184689900
	ii	112.66973250306300	

3_194_kaanichii	aa	133.04535944625800	
	ii		143.02671872012000
3_198_mishkushiu	i	130.05918281160900	
	i		168.89994704881100
3_214_uskaataayaapii	aa		135.4801198113390
	a	129.29341389962700	
	i	90.76683650560650	
Average		118.126779704496	153.033180151412

MN average pitch on final and non-final vowels in words with final affricates / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_051_piisimuhkaanich-h	ii	184.3327019874800	
	i	195.88097802360500	
	aa		197.9999387794910
5_154_wiich-h	ii		214.620123095414
5_209_kaawaastaanikihc hichaapiyich-h	aa	214.3335342524530	
	aa	210.9504012073400	
	i		215.8569415119210
6_051_piisimuhkaanich-h	ii	178.35156843109500	
	i	195.53873319353900	
	aa		197.1975845979980 0
6_154_wiich-h	ii		197.6907772912180 0
6_209_kaawaastaanikihc hichaapiyich-h	aa		215.2690951064190
	a	211.43731754989000	
	i	134.6788318875340	
Average		190.688008316617	206.43907673041

MN average pitch on final and non-final vowels in words with final affricates

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accente
5_082_kaawaastaanikihc hichaapiyich	i		210.7094678688900 0
	aa	204.10776513448400	
	i	99.31209530561260	
5_096_wiich	ii		201.6465367294540
6_082_kaawaastaanikihc	i	211.123158233508	
	aa		219.1817796673810

hichaapiyich	i	199.6298886240360	
6_096_wiich	ii		200.2424878180410 0
Average		178.54322682441	207.945068020942

MN average pitch on final and non-final vowels in words with final continuants / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_010_uhkumis-h	u	185.60942240939700	
	u		201.2305988708420 0
5_017_ukushish-h	u	186.73949973115000	
	u		209.1829847761600
5_027_muuhkamaanish-h	uu	196.14679316242800	
	u		213.8801017164000 0
	aa	203.0984311118850	
5_054_paashchikinish-h	aa	193.17959260007700	
	i	199.8969682748340	
	i		221.6924181824250 0
5_073_mitaas-h	i	171.94543871499000	
	aa		194.9732576137240 0
5_112_shiipiishish-h	ii	203.99492919073200	
	ii		225.7080550154910 0
5_114_mishchikush-h	i	203.64518556988700	
	i		249.0111744849990 0
5_115_utaanis-h	u	209.24606278083900	
	aa		236.0252156118860 0
5_117_miinish-h	ii		210.9484334716640 0

5_134_iiyiyukimikush-h	ii	188.64344107086200	
	u	221.2049253417070	
	i		231.9484933811010 0
5_135_usikus-h	u	179.13935139296700	
	i		264.3466080898270 0
5_137_uchaapaanish-h	aa	208.41825062582200	
	aa		219.9065363252790 0
	i	139.15836242893900	
5_146_ukusis-h	u	199.5955760613880	
	u		228.6863752104760 0
5_182_saakihikinipaasku sh-h	aa	225.2072490161340	
	i		229.5065828225280 0
	aa	228.11881614400100	
5_199_wiitimus-h	ii	188.37561757009400	
	i		213.7915725386850 0
5_212_uchishkwaachihch iish-h	i	197.35844741473400	
	aa	213.25760565899600	
	ii		220.0099348345750
6_010_uhkumis-h	u	179.31716703997500	
	u		203.5672101957770 0
6_017_ukushish-h	u	196.02722573708100	
	u		211.8320485351090 0
6_027_muuhkamaanish-h	uu	192.760349579759	
	aa		199.4461478789380 0
6_054_paashchikinish-h	aa	192.16260478786800	
	i	194.40437518595200	
	i		209.6346374846460

			0
6_073_mitaas-h	i	169.3727669907940	
	aa		195.4079914010170
6_112_shiipiishish-h	ii	214.48945045168500	
	ii		226.9932519076730
6_114_mishchikush-h	i	199.4035063423280	
	i		243.4303207396730
6_115_utaanis-h	u	192.46669559023	
	aa		221.5363099690930
6_117_miinish-h	ii		207.0932956382760
			0
6_134_iiyiyukimikush-h	ii	196.11793778476400	
	u	209.0683964402660	
	i		216.0983656093670
6_135_usikus-h	u	206.9783894704040	
	i		252.448116390824
6_137_uchaapaanish-h	aa	145.6796578947320	
	aa		219.3639180821420
	i	158.5289643054630	
6_146_ukusis-h	u	184.87358391306800	
	u		226.4193898875800
6_182_saakihikinipaaskush-h	i		223.380138207313
	i	217.90342011215900	
	aa	217.35213236723000	
6_199_wiitimus-h	ii	187.80984214425800	
	i		212.1093492577910
6_212_uchishkwaachihchiish-h	i	197.54026163436600	
	aa	209.0376802084790	
	ii		212.1378009219590
			0
Average		195.201814006164	220.367082345414

MN average pitch on final and non-final vowels in words with final continuants

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_011_muuhkumaanish	uu	169.2895326539550	
	u	189.3247244466690	
	aa		190.3783102077930
5_016_uchaapaanish	u	178.168913956666	
	aa	181.1162644817880	
	aa		194.6403925295230 0
5_018_muusuyaas	uu	188.78649101444000	
	uu		213.4459523427870 0
	aa	164.1359713770010	
5_033_niwiitimus	i	150.9363222022040	
	i		199.2222786257170
5_038_iiyiyiukimikw	ii	185.96761526206800	
	u	197.90415516657900	
	i		207.0286030158600 0
5_040_nisikus	i	175.91065060057600	
	i		218.8857586014800
5_067_nihkumis	i	198.723896966275	
	u		219.8664320083930 0
5_087_miinish	ii		144.4260620664370 0
5_099_shiipiishish	ii		234.8628287924440
	ii	164.7176625326110	
5_107_mitaas	i		206.8999251727390 0
	aa	168.7844305990770	
5_109_nitaanis	aa		204.8549599993930 0
5_120_nikushish	i	191.10598931579900	

	u		222.9869337676560 0
5_142_paashchishikinish	aa		202.7472961131090 0
	i	101.97459374695600	
	i	111.91968264363900	
5_144_wiyaas	i		223.4421660276950 0
	aa	185.44279670851300	
5_161_nikusis	i	196.7373548908850	
	u		239.1093837765000
5_168_uschishkwaachihiish	i	200.50760262690700	
	aa		220.9074014461140 0
	ii	168.86386497719000	
5_197_mishchikush	i	201.55764421640200	
	i		224.1499971200140 0
5_211_saakihiikinipaakush	ii	221.7078222835660	
	i		225.5545088796970
	aa	210.60477288547600	
6_011_muuhkumaanish	uu	177.18025405072600	
	u	185.12648294241000	
	aa		189.8907165555570 0
6_016_uchaapaanish	u	179.67400308315300	
	aa	185.2697313740180	
	aa		196.1395354610200
6_018_muusuyaas	uu	188.6456518154260	
	u		211.5338072062540 0
	aa	169.3322990816310	
6_033_niwiitimus	i	89.05067210617750	
	i		204.9699133500880 0
6_038_iiyiyiukimikw	i	164.02831353765500	
	i	199.02808871866800	

	i		209.8395873246580
6_040_nisikus	i	188.67559642505600	
	u		214.5934645682070 0
6_067_nihkumis	i	198.33092356009800	
	u		211.2789637998090 0
6_087_miinish	ii		210.3909777959500 0
6_099_shiipiishish	ii		242.1715244838380 0
	ii	159.08776238312400	
6_107_mitaas	i		213.5879748186850 0
	aa	164.99240553662400	
6_109_nitaanis	aa		206.8718535307510 0
6_120_nikushish	i	152.52494459454000	
	u		229.5392677368220 0
6_142_paashchishikinish	aa	199.3437870298740	
	i	209.50517367099400	
	i		224.9070330748960
6_144_wiyaas	i		226.7502419239740
	aa	179.59616780743200	
6_161_nikusis	i	195.2963896992140	
	u		232.4035890165510
6_168_uschishkwaachihiish	u		199.9238780633970 0
	aa	174.2581725634460	
	ii	164.58191976512700	
6_197_mishchikush	i	201.4687928017400	
	i		224.9778030432690
6_211_saakihikinipaakush	ii	214.54154260661400	
	i		223.4318731228540
	aa	154.96458259266600	
Average		178.232443767427	212.961422093609

MN average pitch on final and non-final vowels in words with final nasals /+ h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_055_muuhkumaan-h	uu	183.42038879922600	
	u		216.3570244410520
	aa	200.23881985175800	0
5_057_mihtihkaan-h	a	179.9530647048840	
	aa		211.9135409897860
5_064_usisim-h	u	177.83870297092700	
	i		218.0336121157470
5_084_utiyiyim-h	u	206.0250437428600	
	i	218.2784485946060	
	i		228.0748264121010
5_088_uhkum-h	u	191.686639572314	
	u		240.0218209148220
5_091_chiimaan-h			210.8368335523520
	uu		0
5_103_paashtaaumiichim-h	aa	203.5683671916160	
	aa	206.36907510143400	
	ii	212.00623966037900	
5_108_uskutim-h	i		227.8234485765380
			0
	u	211.55143821278500	
5_118_umushum-h	u	216.70903789383400	
	i		228.0227642950320
5_128_utiwaashishiim-h			0
	u	157.57938921149800	
5_118_umushum-h	u		231.3742216058000
			0
5_128_utiwaashishiim-h	u	188.93702611783700	
	aa	204.3047561528910	

	ii		219.0825467211690 0
5_136_aatiyuuhkaan-h	uu		219.9347052476030 0
	aa	219.7241644594010	
5_139_wiichishaan-h	ii	219.77032414858300	
	aa		229.6275857750570 0
5_143_miichim-h	ii	212.52307980346300	
	i		240.2782813725870 0
5_152_pipunikaan-h	u	208.28185270049300	
	i	206.3696468415920	
	aa		220.3272401927460 0
5_165_utaanishkiwishiim-h	aa	208.04107776217600	
	i	228.0608396967840	
	ii		235.2988155504190
5_205_piihtiwipichiwiyaan aan-h	i	220.6929065379180	
	i		235.3190564561760 0
	aa	232.4705325199300	
5_207_mitutisaan-h	i	187.83191571607400	
	u	201.58053434559600	
	aa		210.0688349416570
6_055_muuhkumaan-h	uu	165.51454284794700	
	u		206.5110568939490
	aa	200.69665845155700	
6_057_mihtihkaan-h	i	182.63821597173600	
	aa		209.4702551983510 0
6_064_usisim-h	u	180.94206914229900	
	i		216.9837719696170
6_084_utiyyim-h	u	166.08096976765700	
	i		220.1019018480060 0
	i	217.81252116454600	

6_088_uhkum-h	u	207.0064667831090	
	u		228.4803492108880
6_091_chiimaan-h	ii		204.0791352216730
			0
6_103_paashtaaumiichim-h	aa	203.68146264631700	
	aa	205.07536734886900	
	ii	208.8237537456470	
6_108_uskutim-h	i		217.2252789743870
			0
6_108_uskutim-h	u	205.35429146609900	
	u	208.72267513958600	
	i		217.3104959613660
6_118_umushum-h			0
6_128_utiwaashishiim-h	u	198.43800868706300	
	u		232.4792813631500
	i	192.0046905469160	
	aa	201.95822980731800	
6_136_aatiyuuhkaan-h	ii		208.4569403745900
			0
6_139_wiichishaan-h	i	197.81833544609400	
	uu	207.45758578918500	
	aa		218.2061263496010
6_143_miichim-h	ii	213.68407047548900	
			223.7939283789490
	aa		0
6_152_pipunikaan-h	ii	198.09149127795600	
	i		232.8122468238320
			0
6_152_pipunikaan-h	u	201.25765066921200	
	i		210.8043616651350
			0
6_165_utaanishkiwishiim-h	aa	208.570205580276	
	aa	204.94528173799600	
	i	221.48549070736700	
6_205_piihtiwipichiwiyaan	ii		225.8892210933570
	i	222.4087066890880	
	aa		225.0916412956840

aan-h	a	220.02966387634100	
6_207_mitutisaan-h	i	166.5550477457190	
	u	205.30007624333000	
	aa		212.1423349016120 0
Average		202.191827208784	221.536279020141

MN average pitch on final and non-final vowels in words with final nasals

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_003_nitiyim	i		207.2836879797890 0
	i	193.18768893414	
5_012_pipunikaan	u		197.7528894663420 0
	i	181.95301488930200	
	aa	153.95846455813000	
5_019_miichim	ii		203.0481612640510 0
	i	170.95372170910700	
5_030_muuhkumaanish	uu	202.47571553698200	
	u		233.4782542731790 0
	aa	142.13138301960000	
5_031_mihtihkaan	i		206.1416112656230 0
	aa	162.03160396978200	
5_035_paashtaaumiichim	aa		202.3560730312380 0
	ii	201.20927093150200	
	i	182.8989582404580	
5_063_piisimiuhkaan	i	142.38784181409900	
	i		214.3268054556810 0
	aa	146.04544081049600	
5_075_niichishaan	ii		199.0157515744990

			0
	aa	168.59431082467900	
5_078_mitutisaan	i	169.40627415217200	
	u		212.1607762833210
			0
	aa	151.3141291589490	
5_089_nuuhkum	uu		225.8174878120740
			0
	u	157.81596654079400	
5_092_nitiwaashishiim	aa		221.6408551309840
			0
	ii	167.00989409920100	
5_095_nitaaniskutaapaam	u		225.1954787368450
			0
	aa	203.88355660571100	
	aa	154.38044314425900	
5_126_nisisim	i		214.3259230152250
	i	190.43583413126600	
5_127_piihtuwupichiwiyaanaa	i	218.09178948306000	
	i		226.8366123654890
			0
	aa	150.95417841537000	
5_162_nitaanishkiwishiim	aa	210.8662841570540	
	i		239.9517584175190
	ii	175.86984382425000	
5_173_uskutim	u	207.26114368417500	
	u		242.1287392967020
	i	178.25560776397800	
5_188_chiimaan	ii		184.7551719592780
			0
	aa	160.5677660079410	
5_195_nimushum	i		203.6249112739980
			0
	u	174.65987142385100	
5_210_aatiyuuhkaan	i	228.00395709563900	
	uu		232.3168634620170
			0

	aa	172.10522653306600	
6_003_nitiyim	i	88.68871717820000	
	i		201.5091119826790
	i	180.3440577309450	
6_012_pipunikaan	i	174.7640089390980	
	u		198.6940972948410
	aa	149.37329291530500	
6_019_miichim	ii		198.9516926305950
	i	165.00471732744300	0
6_030_muuhkumaanish	uu	188.99500500092500	
	u		202.4799120362090
	aa	154.19473030665900	
6_031_mihtihkaan	i		210.3012918962040
	aa	146.96972125844800	0
6_035_paashtaaumiichim	aa	201.03745779349900	
	ii		212.7539470932370
	i	180.625893136947	0
	ii	190.0629613658860	
6_063_piisimiuhkaan	i		217.4284257967180
	aa	156.3742128093870	0
	aa	169.99947808929200	
6_075_nichishaan	i		204.9314367947060
	aa	169.99947808929200	0
6_078_mitutisaan	i	173.70369279912500	
	u		214.3530342659300
	aa	179.06479861278900	0
6_089_nuuhkum	uu		230.9931635125620
	u	151.3336848231780	0
6_092_nitiwaashishiim	i	202.33502393105800	
	aa		222.5195407434930
			0

	ii	175.6934254971020	
	u	200.55316668596000	
6_095_nitaaniskutaapaam	aa		204.7520910824740
		0	
	aa	162.33475020596200	
6_126_nisisim	i		227.5621432734540
		0	
	i	182.05946270636800	
6_127_piihtuwupichiwiyaanaa	i	202.69820037870900	
	i		215.1087064605860
		0	
	aa	158.87521654111400	
6_162_nitaanishkiwishiim	aa	212.5570579133780	
	i		232.7236271413130
		0	
	ii	169.83268482526500	
6_173_uskutim	u	213.13465670668100	
	u		253.6869764979610
		0	
	i	84.36096093384400	
6_188_chiimaan	ii		220.0212831349340
		0	
	aa	166.24074722516000	
6_195_nimushum	i		208.9812135929840
		0	
	u	163.0277949368150	
6_210_aatiyuuhkaan	i	224.00930677069500	
	uu		235.4872468863580
		0	
	aa	174.17907170117500	
Average		174.352285641757	215.931493531081

MN average pitch on final and non-final vowels in words with final plosives / +h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_005_mitukihp-h	i	165.41233770196000	

	i	187.72847927247200	
	i		197.1518400423590 0
5_006_niimaawiniwit-h	ii	159.9970864196900	
	aa	192.29523179599900	
	i		202.1750139708090 0
5_007_misinihiikinaachini wit-h	aa	189.15328853068800	
	i		193.6797477969050 0
	i	192.94109324094700	
5_029_maschisk-h	a	180.60252112448300	
	i		186.1630052749640 0
5_036_chaachishaapaaya aukuhp-h	i	201.49936800121800	
	aa	196.38579835219000	
	aa		207.0075400355580 0
5_039_uschikimikw-h	u	188.40569020846300	
	i	193.77806127931100	
	i		209.4730004132990 0
5_050_shuwiyaaniwit-h	u	199.93051575832600	
	aa	208.96789596727900	
	i		227.5674393691450 0
5_056_chiskutimaatuukim ikw-h	aa	189.646014766544	
	uu	203.03664838582200	
	i		209.1578605578280 0
5_060_astaasuukimikw-h	aa	153.76034423756200	
	uu	207.18444329132000	
	i		223.1297983553550 0
5_061_wiikhwaayaaukhp- h	ii		183.887379060801
	u	162.09613898209400	
	aa	139.30108821230000	

5_066_chimuwinikuhp-h	i	94.16810468339580	
	u	146.31588415516800	
	i		212.7899356486430 0
5_068_piishaakinikuhp-h	aa		214.0675661616840
	i	212.62599181117700	
	i	213.69800230971200	
5_074_shuwuyaanimikw-h	aa	194.59500121386700	
	i	196.0678553616880	
	i		217.4949393602930 179.4056179446580 0
5_079_akhup-h	a		
5_085_uschisk-h	u		216.1522457567410 0
5_086_uut-h	uu		92.90885311670250
5_100_wiikhwaayaaukuhp-h	ii	197.15134856138300	
	u	203.48349294542300	
	aa		208.3522082250660 0
5_113_chiipiimishtikuwit-h	i	207.61552743184900	
	u		217.5234037389610
5_119_panikik-h	a	178.6284231771910	
	i		191.8947553036330 0
5_131_mishtikw-h	i		222.6953928684600 0
5_132_chiipiikimikw-h	i	189.98246894138000	
	ii	209.7022881909150	
	i		220.1582568736680 0
5_149_uut-h	uu		207.2928645647830 0
5_155_uwaatinikuhp-h	u	159.46416871474700	
	aa	197.3537206967140	
	i		212.3495127279920 0

5_156_miiwit-h	ii	197.46175764491500	
	u		229.2582027179550 0
5_157_chishaayaakwaapit-h	aa	207.4415703481660	
	aa	210.66027610776700	
	i		220.2122548492960 0
5_170_miichisuukimikw-h	ii	166.18944149827500	
	uu	209.7041702458700	
	i		214.8281221519130
5_171_nipaaukinikw-h	aa	215.44856820317700	
	u	210.85256179509000	
	i		230.4335300907840 0
5_184_miinaahtikw-h	ii	199.20582166826000	
	aa	203.8336355181870	
	i		217.0226816741860 0
5_191_iiyimiichiiwaahp-h	ii	210.67523783355400	
	ii	213.89264914621500	
	aa		216.7081866693530 0
5_200_nisk-h	i		178.8628916094520 0
5_206_iyik-h	i	198.92440071713900	
	i		200.1941113226700 0
5_48_waat-h	aa		180.8456194136350 0
6_005_mitukihp-h	i	84.83881853002300	
	u	186.9890667510040	
	i		199.0504524851560 0
6_006_niimaawiniwit-h	ii	179.86836995284900	
	aa	181.98965571733400	
	i		201.7406188254640

			0
6_007_misinihiikinaachini wit-h	i	190.94698561057800	
	aa	185.77478918604000	
	i		194.3330663410410
6_029_maschisk-h	a	171.7407529256980	
	i		183.0357172185500
6_036_chachishaapaayaa ukuhp-h			0
	i		208.5976418724940
			0
	aa	197.3533486638630	
	aa	207.39135651987500	
	u	193.6339211594940	
6_039_uschikimikw-h	i	194.6425891221400	
	i		204.1817490669940
			0
6_048_waat-h	aa		189.5084704421230
			0
6_050_shuwiyaaniwit-h	i	195.6394823098920	
	aa	200.20457895947100	
	i		214.6138723920620
6_056_chiskutimaatuukim ikw-h			0
	aa	188.8275470698810	
	uu	194.98209534163100	
6_060_astaasuukimikw-h	i		203.2665477976120
			0
	aa	202.65340938488900	
	uu	196.20019779968700	
	i		217.0439148079610
6_066_chimuwinikuhp-h			0
	i	193.7195464007360	
	u	205.8698745830340	
6_068_piishaakinikuhp-h	i		207.1315435447940
	aa	198.55739550409000	
	i	206.20425331199000	
6_074_shuwuyaanimikw	i		210.2312473376150
			0
	aa	201.12046479652000	

-h	i	196.1958969853080	
	i		209.9910482553680 0
6_079_akhup-h	a		200.9735465744370 0
6_085_uschisk-h	u		180.5285368496490 0
6_086_uut-h	uu		183.7717336798130 0
6_100_wiihkwaayaaukuhp -h	aa	196.3347842344030	
	aa	193.1106781567530	
	aa		197.3665841353830
6_113_chiipiimishtikuwit- h	i	146.29152330677400	
	i	212.581358025751	
	u		217.1959516878760 0
6_119_panikik-h	a	176.6098046460090	
	i		189.2871245053300 0
6_131_mishtikw-h	i	197.62195330988800	
	i		214.9064131284600
6_132_chiipiikimikw-h	ii	206.5404773608270	
	i		222.1648313993570 0
6_149_uut-h	uu		214.7801069476170
6_155_uwaatinikuhp-h	u	189.9983609042890	
	aa	192.35179993473500	
	i		213.4396518926590
6_156_miiwit-h	ii	208.18838279404500	
	i		228.0499918785190
6_157_chishaayaakwaapit -h	aa	204.8937636700690	
	aa	210.97758330753300	
	i		216.4925573959460 0
6_170_miichisuukimikw-h	ii	205.64324756833800	
	uu	207.43474580805000	
	i		208.5387074690400

			0
6_171_nipaaukinikw-h	aa	203.6799316484340	
	u	204.31188667296200	
	i		221.0504130905210
			0
6_184_miinaahtikw-h	ii	196.0773221275120	
	aa	203.86082702964500	
	i		229.1382693627400
			0
6_191_iiyimiichiiwaahp-h	ii	206.33580409617500	
	ii		215.2685648569300
	aa	211.99635979778800	
6_200_nisk-h	i		183.5740526904680
6_206_iyik-h	i	188.39149268519700	
	i		195.6276862250850
			0
Average		191.863380877765	205.01149828293

MN average pitch on final and non-final vowels in words with final plosives

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_004_uut	uu		181.6402839788900
5_021_uwaatinikuhp	u	197.25744280571400	
	aa	190.8260266372730	
	u		197.9096550768800
			0
5_023_mitukihp	i	180.97898627256300	
	u		205.6557864172400
	i	161.80546908920600	
			0
5_024_miiwit	ii		211.7999501834100
	i	167.1486795974960	
			0
5_026_chaashishaapaaya	i	163.1621638138390	
	aa		202.0756318401320

akuhp			0
	aa	193.6104016737140	
5_034_uschikimikw	u		192.4300102565620
	i	190.19544489695200	
5_043_waat	aa		172.9038992027510
5_045_iitaamiskimikw	ii	191.04627729675600	
	aa		202.2931452044420
	i	197.93696527874200	
5_049_chiipiikimikw	ii	188.84071169874700	
	ii	197.45507804279300	
	i		205.6264675483040
			0
5_052_akuhp	a		194.9178669148630
			0
5_053_misinihiikinaachini wit	i	195.6738142724730	
	aa		196.0358349296960
	i	193.47385359525900	
5_062_iiyimiichiwaahp	ii	101.62607605811400	
	ii		214.6229844008160
			0
	aa	150.7057775005200	
5_069_miinaahtikw	ii	208.123960898321	
	aa		221.3277932358610
			0
	i	169.71446155824200	
5_071_piishaakinikuhp	aa	143.5062878406240	
	i		210.3305054799400
			0
	i	191.20782402787200	
5_094_shuwiyaaniwit	u		215.3586573003790
	aa	209.78767093959400	
	i	196.43475946105400	
5_104_chishaayaakwaapi t	aa	210.4200083157860	
	aa		216.8899965708600
	i	154.34523603512900	
5_123_nipaaukimikw	i	91.67208546223980	
	aa	105.69623439264100	
	i		222.3963033480940

			0
5_129_nimihtinikaat	i	214.50498681507400	
	u		231.6807232208010
	aa	165.82648824956500	
5_145_miichisuukimikw	ii	206.25060558061300	
	uu	179.48488509461800	
	i		228.9100334970150
5_166_mishtikw			0
	i		212.1509601478330
			0
5_169_niimaawiniwit	i	156.21152695213800	
	ii	206.19527798249900	
	aa		214.6069350839030
5_172_chimuwinikuhp			0
	i	203.44504229876100	
	i	215.51379791150400	
5_178_astaasuukinikw	u	214.97586697807100	
	i		228.5972569573230
	aa	218.61495876727000	
5_185_shuwiyaanikinikw	uu	203.44343684326400	
			230.5418393364970
	i		0
5_193_chiipiimishtikuwit	aa	206.07352754546800	
	i	216.8384058171410	
	i		220.0962180980270
5_196_chiskutimaatuukini kw	i	195.44199697567600	
	i		206.5039000328670
	u	198.70209417579700	0
5_208_mishtikuwit	aa	204.60990626869000	
	uu	209.97224262078100	
	i		216.1208866697050
6_004_uut			0
	i		204.5614941134620
	u	193.2214936149290	
	uu		194.3122641466650
			0

6_021_uwaainikuhp	i		189.7079902856730 0
	aa	179.15870148608300	
	i	189.60908602742200	
6_023_mitukihp	i	185.43550894387400	
	u		201.4166867763690 0
	i	164.98966837341900	
6_024_miiwit	ii		206.0489051857870 0
	i	155.00412954048100	
6_026_chaashishaapaaya akuhp	i		206.5158288912900 0
	aa	194.16727089879900	
	aa	188.60544526184000	
6_034_uschikimikw	u	190.37189682605400	
	i		212.0400972204060 0
6_043_waat	aa		165.3670599961290 0
6_045_iitaamiskimikw	ii	184.59084656695300	
	aa	198.68644085581000	
	i		212.5235257858160 0
6_049_chiipiikimikw	ii	191.405412771958	
	ii		200.6960640734530 0
	i	199.66083196978400	
6_052_akuhp	a		162.6780873610680 0
6_053_misinihiikinaachini wit	aa	191.49312373582700	
	i		203.9636247170550 0
	i	188.32746032421200	
6_061_wiikhwaayaaukuh	ii	173.46591191112200	
	aa	200.09319410793700	

p	a		200.4047061680370
6_062_iiyimiichiwaahp	ii	167.1981458357550	
	ii		220.3616902484550
	aa	156.86033034084500	
6_065_uut	uu		156.0343857867300 0
6_069_miinaahtikw	ii	201.2407470523700	
	aa		210.282933575969
	i	161.78694033603800	
6_071_piishaakinikuhp	aa	188.86061223711300	
	i		197.3347988454580 0
	i	190.19513488890200	
6_094_shuwiyaaniwit	u		217.1763353700420 0
	aa	215.09422150721600	
	i	184.23620609434700	
6_104_chishaayaakwaapi t	aa	203.00668140811100	
	aa		216.8582849687450 0
	i	149.84932449419600	
6_123_nipaaukimikw	a	202.44993547577100	
	u	204.82439146328900	
	i		225.2746103267040
6_129_nimihtinikaat	i	199.2701300569340	
	u		212.2353212537430
	aa	161.9222429177960	
6_145_miichisuukimikw	ii	197.43780106884300	
	uu	220.6604949761720	
	i		226.7827754934820
6_166_mishtikw	i		219.4221907717380 0
	i	162.95012053124400	
6_169_niimaawiniwit	ii	194.45698023406500	
	aa	204.50397186105100	
	i		206.1894972306710
6_172_chimuwinikuhp	i	206.3317011379740	
	u	211.27197889550900	

	i		222.0491223074710 0
6_178_astaasuukinikw	aa	204.16845693303	
	uu	199.92637233724000	
	i		217.4128895481580 0
6_185_shuwiyaanikinikw	aa	203.6766744884910	
	i	204.48980566322400	
	i		223.9001392515580 0
6_193_chiipiimishtikuwit	i	190.6880865624300	
	i	196.07662584751500	
	u		196.4141174244600 0
6_196_chiskutimaatuukini kw	aa	201.4915659447550	
	uu	206.27549791107100	
	i		213.7682862350970 0
6_208_mishtikuwit	i		189.6858251091250 0
	u	160.93119779790900	
Average		187.546394931715	206.872197560748

MN average pitch on final and non-final vowels in words with final vowels / + h/

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_015_kaanichii-h	aa	177.47897758391600	
	ii		188.7970388536660 0
5_025_uskaataayaapii-h	aa	191.4279767509700	
	aa	191.34406031330900	
	ii		196.9954438662880
5_032_mihtiwikii-h	i	173.92984140601400	
	i	192.2865556096120	
	ii		198.5416880169860 0

5_042_maaskiniu-h	aa	176.41306757916600	
	i		192.1304848037330 0
	u	177.30249718635100	
5_044_kishkichaau-h	i	193.65776780566800	
	aa		204.3388356209100 0
5_081_iischiimaauschii-h	i		218.4127162731300 0
	aa	204.10642272488000	
	ii	206.70620129705300	
5_083_mishkushiu-h	i	190.52326500836500	
	u		218.85445695355
5_097_miinaapuu-h	ii	191.99476077140500	
	aa	199.78587227610800	
	uu		211.4388407304960 0
5_101_mitihchii-h	i	197.32464335068100	
	ii		200.3625801030570 0
5_102_shikutaau-h	i	206.87848292112200	
	i		207.9291770566830 0
	aa	202.3171632142010	
5_124_wiichiyyiyiu-h	ii	120.2578418913800	
	ii		217.7642266669840 0
	i	208.38558679489300	
5_138_siipii-h	ii		213.8508193949890 0
	ii	207.1542024672320	
5_140_aschii-h	i	177.77840816660100	
	ii		220.9300739586360 0
5_158_waau-h	aa	197.96134764756200	
	i		205.5589881245070
5_163_muushtaau-h	uu	198.16985231587700	

	aa		208.9268182954990
5_174_nichishkaatuu-h	aa	210.30972231167800	
	uu		212.6420160535010
			0
5_177_uniwii-h	u	196.5996696597890	
	ii		199.3544578987300
			0
5_179_pipaayihtaamuu-h	aa	194.27556817620800	
	aa	194.38673060089200	
	uu		201.1314195772000
5_183_uskaataayaapii-h			0
	aa		212.5166365337260
			0
	aa	211.5828413799900	
	ii	210.58320023556400	
5_201_utimiskumaau-h	u		219.2538276088970
			0
	aa	214.25861167178200	
6_015_kaanichii-h	u	196.25272181095900	
	aa	179.6774948593110	
	ii		187.0646168951320
6_025_uskaataayaapii-h			193.7824134944000
	aa		0
	aa	192.32438775227500	
6_032_mihtiwikii-h	ii	190.1573613718170	
	i	194.48036789621200	
	i	187.45437241472300	
6_042_maaskiniu-h	ii		195.4737941741330
	aa	178.49311836934100	
	i	185.47039914220900	
6_044_kishkichaau-h	u		193.1177826680470
	i	199.3431372926570	
	aa		209.2812343965190
6_081_iischiimaauschii-h	u	194.1454645938960	
	i		208.0581953954090
	aa	195.95191781053500	
6_083_mishkushiu-h	ii	202.9595859839310	
	i	184.9692582334360	

	u		212.5679739274410 0
6_097_miinaapuu-h	ii	189.55600013593500	
	aa	200.00791789471700	
	uu		208.4815503720710 0
6_101_mitihchii-h	i		203.15870152177
	ii	202.706980677952	
6_102_shikutaau-h	i		221.1470872105590
	aa	206.41002289484400	
	u	175.65337314251900	
6_124_wiichiyyiyiu-h	ii	97.02076981720580	
	ii		213.9057678280950 0
	u	199.54299489946400	
6_138_siipii-h	ii	215.21453973504100	
	ii		217.8420477659480 0
6_140_aschii-h	a	213.51090980069400	
	ii		219.2961856785800 0
6_158_waau-h	aa		206.0654010518340
	u	204.80682128341700	
6_163_muushtaau-h	aa		212.1854750651270 0
	u	204.4226279168410	
	u	191.8709218730920	
6_174_nichishkaatuu-h	aa	164.8585938565760	
	uu		204.8687645997890
6_177_uniwii-h	u	198.57405639004100	
	ii		205.9054028843430
6_179_pipaayihtaamuu-h	aa	189.1869304376570	
	aa	193.97129754514700	
	uu		197.8009397240450 0
6_183_uskaataayaapii-h	aa	206.47263769241500	
	aa		213.5796013997860

6_201_utimiskumaau-h			0
	ii	206.32326730566300	
	u		222.1967150115060
			0
	aa	209.61600110876200	
	u	180.19864049380900	
Average		192.690097283087	207.387754936392

MN average pitch on final and non-final vowels in words with final vowels

Filename	Segment label	Avg. pitch non-accented	Avg. pitch accented
5_013_miinaapuu	ii		193.0881725959720
			0
	aa	191.4173253234120	
5_014_muushtau	u	141.0708686126430	
	uu		173.6165952661970
			0
5_041_waau	aa	147.00633542162300	
			184.5812432255310
			0
5_046_mitihchii	u	155.14183555611500	
	i		207.9584336945630
			0
5_047_maaskiniu	ii	185.951819599181	
	aa	193.09301673757400	
			211.3239393057730
5_070_uniwii	i		
	u	142.65935349907700	
			205.344591363084
5_072_iischiimaauschii	ii	163.47810993197400	
	i		222.0159272395220
			0
5_141_niwiichiyyiu	aa	209.6387720232920	
	ii	167.7527546451680	
	i	214.26226642128100	
	ii		228.8197513510380

			0
	i	184.25729988814000	
5_148_mihtiwikii	i	212.45521887518100	
	i		230.8344865147440
			0
	ii	185.24684863989100	
5_164_wichii	i		205.7593341374260
			0
	ii	162.85595276409500	
5_167_uskaataayaapii			215.0653200143310
			0
	aa	213.1309359661160	
	ii	172.62429535152400	
5_180_siipii	ii		221.0698089039120
	ii	160.66046670551600	
5_187_shikutaau	i		223.2196801252590
			0
	u	223.10575544229000	
	aa	164.80386628460100	
5_189_miyiu	i		209.8740509464740
			0
	u	155.32544217024600	
5_192_aschii	a		223.9940968832360
			0
	ii	140.6872279398550	
5_194_kaanichii	aa		207.5737636708170
	ii	163.51245404731700	
5_198_mishkushiu	i		224.7353962195470
			0
	u	181.313746237367	
5_214_uskaataayaapii	aa	217.30283325310600	
	aa		228.0830169653900
	ii	169.1901735709060	
6_013_miinaapuu	ii	187.61562647743200	
	aa		189.1536557131600
			0
	ii	147.23891444872300	

6_014_muushtaau	uu		187.4774129651530 0
	aa	131.70876168805000	
6_041_waau	aa		187.0874167815850
	u	175.9538147991520	
6_046_mitihchii	i		200.6494150534900 0
	ii	173.86064663176300	
6_047_maaskiniu	aa	192.21267899567700	
	i		201.8074768289750 0
	u	153.4774346153220	
6_070_uniwii	u		183.6280108861830 0
	ii	180.58793368896800	
6_072_iischiimaauschii	i		209.1764355886260 0
	aa	202.930532506668	
	ii	166.54092003031900	
6_141_niwiichiiyiyiu	ii	206.2332460084380	
	ii		225.8886023869090 0
	u	156.36761286148700	
6_148_mihtiwikii	i	192.45225598045500	
	i		218.092589757863
	ii	188.93451223894300	
6_164_wichii	i		220.9523603197540 0
	ii	167.16198420302500	
6_167_uskaataayaapii	aa	214.87910163479200	
	aa		219.3382470187710 0
	ii	166.4338246657960	
6_180_siipii	ii		217.7273354941700 0
	ii	151.76973031389200	
6_187_shikutaau	i	227.26506995914600	

	u		232.6215059787320 0
	aa	168.65569164655100	
6_189_miyiu	i		210.796127171098
	i	140.14226885065900	
6_192_aschii	a		223.1330670895520 0
	ii	177.35963697891600	
6_194_kaanichii	aa		203.0101817798520 0
	ii	137.81368941586700	
6_198_mishkushiu	i		226.8470724233320 0
	u	160.07516522612300	
6_214_uskaataayaapii	aa	212.21556246265500	
	aa		223.6351023183170
	ii	169.45924994737000	
Average		176.294054638148	211.054989554954

Appendix VIII: Average Intensity on Final and Non-Final Vowels

LBS average intensity on final and non-final vowels in words with final affricates /+h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_051_piisimuhkaan-h	ii	61.377350051841300	
	aa		66.68321070740660
1_137_uchaapaanish-h	u	56.00388604867280	
	aa	68.13228588594350	
	aa		68.9604317637578
1_154_wiich-h	ii		59.90670377632940
1_204_kuskusch-h	u		62.12524134681460
1_209_kaawaastaanikihc hichaapiyich-h	i	60.71696183944750	
	aa		69.72062761821240
	i	61.85539730116550	
2_051_piisimuhkaanich-h	ii	65.9798856038982	
	u	55.66522872952920	
	aa		69.44457808734460
2_154_Wiich-h	ii		56.28667020943450
2_204_Kuskusch-h	u		62.23017723497100
2_209_kaawaastaanikihc hichaapiyich-h	i	59.11343450053080	
	aa		65.24262958075100
	i	61.635690495570700	
Average		61.1644578285111	64.5111411472247

LBS average intensity on final and non-final vowels in words with final affricates

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_020_kuskusch	u	60.70053530485430	
	u		66.62479303386480
1_059_kilwaakis	u	59.46936010796730	
	aa		67.61358458540870
	a	62.63012504912530	
1_082_kaawaastaanikihc hichaapiyich	i	63.022833035629600	
	aa		70.12225498648910
	i	66.04798072912170	
1_096_wiich	ii		67.7519474487431

2_020_kuskusch	u		62.81398370428650 0
2_059_Kilwaakis	u	60.15871856593970	
	a		70.3699814618461
	a	63.82254962389980	
2_082_kaawaastaanikihc hichaapiyich	i	55.423142827903700	
	aa		66.40996196042590
	i	60.52249482393210	
2_096_wiich	ii		59.13601016844870
Average		61.3108600075971	66.3553146686891

LBS average intensity on final and non-final vowels in words with final continuants

/+h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_010_uhkumis-h	u	58.00906824961640	
	u		67.77003223933540
1_017_ukishish-h	u	56.95029604834550	
	i		67.31242472812120
1_027_muuhkumaanish-h	uu	61.75797006786500	
	u	62.911745392165800	
	aa		70.92568214096120
1_054_paashchishikinish-h	i	58.98398278048100	
	i		66.3646935757964
	i	65.7955657520073	
1_073_mitaas-h	i	57.709121669151300	
	aa		67.9797877198892
1_112_shiipiishish-h	ii	62.61811852667650	
	ii		67.34119024368240
1_114_mishchikush-h	i		57.00615516420490
1_115_utaanis-h	u	60.19624034280370	
	aa		70.39670471543720
1_117_miinish-h	ii		67.53190161394340
1_134_iiyiyiukimikush-h	ii	65.08935882624690	
	u		71.03446025857910
	i	67.69075120285050	
1_135_usikus-h	u	50.71318621017200	
	i		55.37909606904230

			0
1_146_ukusis-h	u	60.46794999682900	
	u		64.65090616141490
1_147_mitaas-h	i	55.76246567535620	
	aa		62.2515302630018
1_168_uchishkwaachihch iish-h	u	55.16189749499290	
	aa		67.80211256809020
	ii	58.63044795638250	
1_182_saakihiikinipaakus h-h	i	71.26357898202860	
	i	70.83209138041810	
	aa		72.77432067242300
1_199_wiitimus-h	ii	61.05199480086090	
	i		67.13899370258560
1_212_uchishkwaachihch iish-h	u	53.56224649871600	
	aa	61.225864886746700	
	ii		63.10149186196170
2_001_muusuyaas-h	uu	64.61978251948940	
	u		67.0575307732498
	aa	66.17873017163270	
2_010_uhkumis-h	u	58.469452489808600	
	u		68.2584177026183
2_017_ukushish-h	u	57.797779935904000	
	u		63.49153634281340
2_027_muuhkamaanish-h	uu	58.83790898625130	
	aa		64.73957667069780
2_054_paashchishikinish- h	i	58.70349418142430	
	i		66.32952806283980
	i	65.69377487938790	
2_073_mitaas-h	i	58.16672339796930	
	aa		67.57787439897780
2_080_kilwaakis-h	u	56.18595498487060	
	a		67.13242713513700
	a	63.421717922852600	
2_112_shiipiishish-h	ii	55.635785857235300	
	ii		61.56752286686200
			0
2_114_mishchikush-h	i		54.70751365794350
2_115_utaanis-h	u	55.91231125744290	
	aa		64.63523806997280
2_117_miinish-h	ii		65.10445449483400

2_134_iiyiyiukimikush-h	ii	65.68790573474130	
	u	66.43977873018000	
	i	66.94673327753940	66.94673327753940
2_135_Usikus-h	u	45.94895686669490	
	i		51.06329534676170
2_137_uchaapaanish-h	aa	60.02978232098970	
	aa		63.52091091280340
	i	56.507134700992900	
2_146_ukusis-h	u	60.03226579744110	
	u		62.42413196941460 0
2_147_mitass-h	i	59.52833710574250	
	aa		61.36716765333330 0
2_182_saakihiikinipaasku sh-h	i		62.82941879927410 0
	i	54.407416149884100	
	aa	59.64402579152370	
2_199_wiitimus-h	ii	59.61632600110850	
	i		68.01380789540390
2_212_uchishkwaachihch iish-h	u	53.85475054137430	
	aa		59.58158468367420
	ii	57.927284801217900	
Average		60.0560447205307	64.8086154003506

LBS average intensity on final and non-final vowels in words with final continuants

Filename	Segment label	Avg. int. non- accented	Avg. int. accented
1_001_muusuyaas	uu	63.14556188742320	
	u		64.92522198862300
	aa	62.13811784594600	
1_011_muuhkumaanish	uu	65.21585950453570	
	aa		67.74789518096130
1_016_uchaapaanish	u	58.121913385844000	
	aa		68.06023938351880
	aa	67.54663383600580	
1_018_muusuyaas	uu	62.527001828217000	
	u	64.95377225433460	

	aa		68.11553860356920
1_033_niwiitimus	ii	61.8929324219282	
	i		71.46080379494040
1_037_wiyaas	i		65.89764453802310
	aa	65.78892292486400	
1_038_iiyiyiukimish	ii	65.0564455881261	
	iu		70.17079730092170
	i	67.2679838048778	
	i	64.3288621762894	
1_040_nisikus	i	55.54125770533930	
	i		67.04903181685250
	u	49.381149199258000	
1_058_apis	a		59.81454098551850
1_067_nihkumis	i		68.29474633679200
	u	67.33336711373360	
1_087_miinish	ii		67.73294521707790
1_099_shiipiishish	ii	59.44689330092750	
	ii		66.14499528280330
1_107_mitaas	i	62.58829999690420	
	aa		66.69232341486340
1_109_nitaanis	aa		64.77379704370690
1_120_nikushish	i	57.009993164097300	
	u		66.35877145164180
1_142_paashchishikinish	aa		60.12915788305620
	i	56.69717149671870	
	i	65.13003725988560	
1_144_wiyaas	i		63.88609576189240
	aa	63.83221081788210	
1_151_mitaas	i	56.76056412247590	
	aa		57.56888811247000
1_159_apis	a		56.41567728348760
1_161_nikusis	i	59.819626861426400	
	u		64.04709778897860
1_197_mishchikush	i		57.66532120739700
1_211_saakihiikinipaakush	i		66.63131477271510
	i	59.6890651941313	
	aa	59.851713068860600	
2_011_muuhkumaanish	uu	58.70789246511130	
	aa		64.67688917385590
2_016_uchaapaanish	u	55.709616045908300	

	aa		64.49330577931930
	aa	64.37975683656220	
2_018_muusuyaas	uu	59.369929867556100	
	u		62.59917901464400
			0
	aa	58.17142339455210	
2_033_niwiitimus	ii	62.88074303486260	
	i		71.36959218431720
2_037_wiyaas	i	61.72388281367810	
	aa		62.24493428683990
			0
2_040_nisikus	i		60.54459131798170
2_058_apis	a		55.41391818212300
2_067_nihkumis	i	62.047251267182200	
	u		62.90040513626470
2_087_miinish	ii		62.57314904062960
2_099_shiipiishish	ii	57.12500248634890	
	ii		63.52335663632580
2_107_mitaas	i	56.107696151741600	
	aa		60.60087741818280
2_109_nitaanis	aa		66.37651908714870
2_120_nikushish	i	55.240296658300300	
	u		62.94355652425510
			0
2_142_paashchishikinish	aa	60.58445393274600	
	i	55.69550839993680	
	i		61.18229463167660
2_144_wiyaas	i		61.2727942283699
	aa	59.009204115549800	
2_151_mitaas	i	52.67411700701760	
	aa		55.25713165756770
2_159_apis			56.81832980565590
	a		0
2_161_nikusis	i	57.768998924783100	
	u		63.82809522784860
2_168_uschishkwaachihiish	u	48.67231484150260	
	aa		60.95897283699590
			0

	ii	57.28430255367320	
2_197_mishchikush	i		52.53581605854660
2_211_saakihiikinipaakush	ii	59.309484206924700	
	i		61.29110331890330
	aa	56.49073974347160	0
Average		60.000399366832	63.3252943417968

LBS average intensity on final and non-final vowels in words with final nasals /+h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_055_muuhkumaan-h	uu	63.54592647536650	
	aa		67.49624591879320
1_057_mihtihkaan-h	i	60.46423577562400	
	aa		67.93458111253250
1_064_usisim-h	u	63.61327743806780	
	i		67.53934276577410
1_084_utiyyim-h	u	62.447767503620400	
	i	68.40482508154810	
	i		68.70759110846950
1_088_uhkum-h	u	63.867788095960100	
	u		68.68486281743520
1_091_chiimaan-h	ii	64.16870815069180	
	aa		66.4224422894315
1_103_paashtaaumiichimh	aa		68.37896828887950
	ii	67.69097762062530	
	i	65.68328978243720	
1_108_uskutimh	u	67.20070739132470	
	i		70.4761103133328
1_121_nitaaniskutaapaam-h	u	55.737252989868500	
	aa		69.98686808472650
	aa	66.90124687490100	
1_128_utiwaashishiimh	u	52.09544848623650	
	aa		65.93609523604880
	ii	65.3680952902039	
1_136_aatiyuuhkaan-h	aa	61.42915697634800	
	uu		69.04767482833420
	aa	67.33783358793500	

1_139_wiichishaan-h	ii	62.5669338343829	
	aa		63.86372516927570 0
1_143_miichimh	ii	61.66461041444160	
	i		66.7016010252917
1_152_pipunikaanh	u	55.424763839766500	
	i		65.61897579578920
	aa	48.71109212067980	
1_165_utaanishkiwishiim-h	aa		70.96626730959260
	i	69.64627506934000	
	ii	66.83613070411440	
1_190_aaniskiwikinitihchaan-h	i	70.57367820232920	
	i		72.72507650703610
	aa	70.27106825241570	
1_205_piihtiwipichiwiyaan aan-h	i	55.7790062976634	
	i	67.00311322454300	
	aa		66.85260964632740
1_207_mitutisaanh	i	54.935724845563100	
	u	61.76553075627070	
	aa		63.79968020412950 0
2_009_aaniskiwikinitihchaan-h	i		67.11012386415090
	i	64.62007371936660	
	aa	66.49274983688120	
2_055_muuhkumaan-h	uu	64.77597229458770	
	u	64.75150725184410	
	aa		65.63382257796710
2_057_mihtihkaan-h	aa		64.68485498248960
2_064_usisim-h	u	58.44256198543500	
	i		65.57212209597770
2_084_utiyyim-h	u	56.43783593537430	
	i	65.75054538160520	
	i		66.17922071525330
2_088_uhkum-h	u	62.269708787024900	
	u		63.65820663691380 0
2_091_chiimaan-h	ii	63.56688740591840	
	aa		63.66866518844730 0

2_103_paashtaaumiichim-h	aa		67.7326423989492
	ii	63.61912704947110	
	i	64.25476063310980	
2_108_uskutim-h	u	50.350303217434000	
	u	59.008127595409100	
	i		65.43405411141400
2_118_umushum-h	u		62.03541184180450
	u	62.00137524666910	
2_128_utiwaashishiim-h	u	52.71437768047620	
	aa		62.64153875497670
	ii	59.82196037881010	
2_136_aatiyuuhkaan-h	i	62.29059508953330	
	uu	63.973041917170600	
	aa		64.57738428853840
2_139_wiichishaan-h	ii	61.00274456500170	
	aa		65.09675985118520
2_143_miichim-h	ii	56.59067291450110	
	i		62.43695375057060
2_165_utaanishkiwishiim-h	aa		67.23611331521700
	i	63.65141241838920	
	ii	64.72108975451210	
2_205_piihtiwipichiwiyaan-h	i		63.62270240551770
	aa	61.914221616313700	
2_207_mitutisaan-h	i	49.34816971686950	
	u	61.88876388623020	
	aa		62.66116107306350
Average		61.9885481388718	66.3177273221039

LBS average intensity on final and non-final vowels in words with final nasals

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_003_nitiyim	i		64.84248131777190
	i	62.13191234635140	
1_009_aaniskiwikinitihchan	i		69.33757424071520
	i	65.57657424641880	
	aa	62.21768258888090	
1_012_pipunikaan	u		69.52048801868700
	i	67.20700024064610	

	aa	63.49890416963360	
1_019_miichim	ii		67.52550660702070
	i	63.55144878786690	
1_030_muuhkumaan	uu		66.7406263490592
	u	62.845246337431200	
	aa	54.0157349701222	
1_031_mihtihkaan	i	59.69905016328690	
	aa		60.85467449650700
1_035_paashtaaumiichim	aa		70.53782263271650
	ii	65.38312118742450	
	i	57.5425454168513	
1_063_piisimuhkaan	i		67.83792408793940
	u	62.55754454415280	
	aa	63.7086851078679	
1_075_niichishaan	ii	66.34424269037110	
	aa		67.26662411276810
1_078_mitutisaan	i	63.405343971880200	
	u		68.92776835237030
	aa	63.86315495405800	
1_089_nuuhkum	uu		69.64992118417400
	u	63.728046991058600	
1_092_nitiwaashishiim	i	67.09798902854450	
	aa		68.88343205164400
	ii	61.8909518965526	
1_095_nitaanishkutaapaa m	u	65.42727718416280	
	aa		71.40220413602470
	aa	65.3176689448058	
1_116_chisihiikinaahtikw	ii	60.63319377498400	
	i		65.02881399739460
1_126_nisisim	i		65.53381684020130
	i	62.09519109568220	
1_127_piihtiwipichiwiyaan aan	i	65.67632159786280	
	i		69.06790481567940
	aa	67.28687245912800	
1_162_nitaanishkiwishiim	aa		66.75783910365130
	i	61.96876833417130	
	ii	58.97092616140120	
1_173_uskutim	u		68.5766722226573
	i	66.25758115158550	
1_188_chiimaan	ii		61.80494342552840

	aa	58.16145138251370	
1_195_nimushum	i		66.24865456296880
	u	64.66747344953670	
1_210_aatiyuuhkaan	aa	60.56542034188130	
	uu		65.14115811264
2_003_nitiyim	i		69.26020660782670
	i	68.88393701465240	
2_012_pipunikaan	u		67.5805486489517
	i	67.18345126401890	
	aa	65.22535497818570	
2_019_miichim	ii		61.3894252439459
	i	60.808717054986000	
2_031_mihtihkaan	i		61.35163676835880
	aa	60.72279450183050	0
2_035_paashtaumiichim	aa	60.78429798485660	
	aa		66.30736701779940
	ii	58.841008178194200	
2_063_piisimiuhkaan	ii	59.684883984944600	
	i		63.24254882754600
	u	55.60869676572250	
2_075_niichishaan	ii	60.734593116097600	
	aa		61.73206349242780
2_078_mitutisaan	u		55.99445115631960
			0
2_089_nuuhkum	uu		62.85915525772570
	u	61.89534183332800	
2_092_nitiwaashishiim	u	63.04976935089060	
	aa		66.42440523471690
	ii	58.85062098202690	
2_095_nitaaniskutaapaam	u	56.07477179517940	
	aa		68.65429044367210
	aa	59.28767123853630	
2_126_nisisim	i	58.77362742871960	
	i		59.11675832032760
			0
2_127_piihtuwupichiwiya anaan	i	56.89684495423430	
	i		64.66151580258550
	i	61.860671117235800	

2_162_nitaanishkiwishiim	aa		61.79380350366190
	i	61.46505233373630	0
2_173_uskutim	u	60.78460763598820	
	i		64.587245297747
2_188_chiimaan	ii		62.06039994934100
	aa	60.2924883910208	0
2_190_aaniskiwikinitihchaan	aa	59.69786352082060	
	i		66.98574999166760
	i	65.9230326660966	
2_195_nimushum	u		61.94869648424780
2_210_aatiyuuhkaan	aa	56.232651024056100	
	uu	58.922296316083200	
	aa		60.76792288088090
Average		61.9960423383671	65.4551260399467

LBS average intensity on final and non-final vowels in words with final plosives / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_005_mitukihp-h	i	56.43865933729400	
	u		61.44659127521270
1_006_niimaawiniwit-h	ii	63.582883187844900	0
	aa		66.74117538583720
	i	66.21854736182650	
1_007_misinihiikinaachiniwit-h	aa	65.42794060273920	
	i	63.37396780147850	
	i		65.43793991793300
1_022_aamiiukihp-h	ii		69.4508136786219
	u	68.35341223267070	
	i	65.089960640519	
1_028_wiisist-h	ii	65.55373480758000	
	i		70.60302993174140
1_029_maaschiisk-h	aa		63.56827942384920
	ii	61.05744044660990	
1_036_chaachishaapaaya	aa		70.3556401349802
	aa	63.75385623252890	

aukuhp-h	u	64.52157291935870	
1_039_uschikimikw-h	u	56.18057327499720	
	i	66.06673425271200	
	i		68.68814351194310
1_048_waat-h	aa		67.59693901964350
1_050_shuwiyaaniwit-h	u	65.73586213204730	
	aa		70.95434465486870
	i	66.39520064616220	
1_056_chiskutimaatuukim ikw-h	aa	70.66830951109710	
	uu		70.7960113238279
	i	67.54037753779030	
1_060_astaasuukimikw-h	aa	67.32018303628540	
	uu		68.90669675859180
	i	65.99874162038860	
1_066_chimuwinikuhp-h	i	66.09019658143830	
	i		76.0629016971547
	i	64.27635348652380	
1_068_piishaakinikuhp-h	aa	63.586844234701900	
	i	66.99645345617810	
	i		68.26934646411330
1_074_shuwiyaanikimikw- h	i	66.56624445890280	
	i		68.96060085322070
	i	67.0055372597198	
1_079_akhup-h	a		66.02286113673500
1_085_uschisk-h	u		62.85409001743260
			0
1_100_wiikhwaayaaukuhp -h	aa		70.64930191455140
	aa	66.17023459455920	
	u	57.91841298708360	
1_110_shiipaachipiyuwik uhp-h	i	69.63678172033120	
	u		70.0624736529186
	i	62.753469814115200	
1_111_shiipaachipiyuwiku hp-h	aa		70.28843674486380
	i	69.20370159417460	
	u	63.23267143577740	
1_113_chiipiimishtikuwit- h	i	59.73088766525170	
	u		69.94882183525000
1_119_panikiik-h	a		60.70936120337330
	ii	57.6376967355901	

1_122_nimihtinikaat-h	i	66.70510654913460	
	i	66.89299984399980	
	aa		68.63146586409270
1_129_nimihtinikaat-h	i		69.01096013075640
	i	66.81165019946570	
	aa	62.96963468807640	
1_131_mishtikw-h	i	49.584769141792500	
	i		57.01129121147500
1_132_chiipiikimikw-h	ii	61.0996979380987	
	ii	64.74048390699180	
	i		65.4825244792532
1_149_uut-h	uu		64.82752041332670
1_155_uwaatinikuhp-h	aa		68.67359356157260
	i	61.25204224020650	
1_156_miiwit-h	ii	69.70232770741330	
	i		69.79778920277940
1_157_chishaayaakwaapit-h	aa	68.15655566395980	
	aa		70.45992341770880
	i	63.818137005424200	
1_170_miiichisuukimikw-h	ii	60.523785931594300	
	uu	65.20475442748840	
	i		70.64138393108560
1_171_nipaaukimikw-h	aa		73.14624832011960
	u	58.57087221481790	
	i	67.06264285386340	
1_175_chisihiikinaahtikw-h	ii	62.18719466778950	
	i		67.9948389488667
1_184_miiinaahtikw-h	ii		65.09384293944020
	aa	63.55866330336170	
	i	62.946867515477200	
1_191_iiyimiichiwaahp-h	ii	65.80651796871910	
	i		66.84399002440910
	aa	62.12481177378930	
1_200_nisk-h	i		60.1292575165369
1_206_iyik-h	i		63.83936792059130
	i	56.75911877832170	
2_005_mitukihp-h	i	57.922052076625500	
	u		62.19612528756430
2_006_Niimaawiniwit-h	aa		66.72131471187040
	i	66.23843990126070	

2_007_Misinihiikinaachini wit-h	aa		68.85137001360820
	i	64.74456704793910	
	i	67.82740058079530	
2_022_aamiiukihp-h	i		67.28863974463800
	u	65.48693379216990	
	i	60.83251075549520	
2_028_wiiyisht-h	ii	64.89134595481520	
	i		66.68887899016690
2_029_maschisk-h	a		59.63350445586830
	i	58.51257438306120	
2_036_chaachishaapaaya aukuhp-h	aa		69.77194088121640
	aa	68.60985476494430	
	u	63.762122204675500	
2_039_uschikimikw-h	i	59.57987642815170	
	i		66.08310451009750
	i	63.57097823636750	
2_048_waat-h	aa		64.62175821325790
2_050_Shuwiyaaniwit-h	u	62.774579164014500	
	aa		67.00537082100470
	i	59.28179313335020	
2_056_Chiskutimaatuuki mikw-h	aa	63.157691531497400	
	uu		63.44837614007840 0
	i	62.97084811892670	
2_066_chimuwinikuhp-h	i	59.61132424494110	
	u		67.96170888123910
	i	65.55379747444434	
2_068_piishaakinikuhp-h	aa		64.96826717443510
	i	64.54458565506190	
	i	57.57563747982740	
2_074_shuwuyaanimikw -h	aa		68.85588296627520
	i	64.34332142077130	
	i	63.41206565621270	
2_079_akhup-h	a		64.16994823492080
2_085_uschisk-h	u	55.7205449714164	
	i		56.33689871174810
2_100_wiikhwaayaaukuhp -h	aa	68.25995903718400	
	aa		70.21259234402470
	u	63.162330729980900	
2_110_shiipaachipiyuwiku	i		64.06501109316740

hp-h	u	60.98968409624800	
	u	59.58071721307310	
2_113_Chiipiimishtikuwit-h	i	53.80610380757470	
	u		65.41215917752320
2_119_panikik-h	a		59.81977734929570
	i	55.26057701756860	
	i	54.5995005811157	
2_122_Nimihtinikaat-h	i		64.24530584010360
	i	62.98323886640910	
	aa	63.972324780603100	
2_131_mishtikw-h	i		56.95214482680470
2_132_chiipiikimikw-h	ii	61.08234381671690	
	ii	62.186876486824600	
	i		64.50027335569970
2_149_Uut-h	uu		59.99238174471880
2_155_uwaatinikuhp-h	u	62.10330818451460	
	aa	61.386486715436900	
	i		65.50450219170340
2_156_Miiwit-h	ii		64.05261034731720
	i	56.15447271505850	
2_157_Chishaayaakwaapi t-h	aa	64.47337976176790	
	aa		65.88327383364940
	i	57.30272204378120	
2_170_miiichisuukimikw-h	ii	57.98944409295150	
	uu	59.62653817017750	
	i		63.99006265007500
2_171_nipaaukinikw-h	i	59.19530808435550	
	aa		66.11091993580170
	i	65.2525808467061	
2_172_chimuwinikuhp-h	i	60.14805468785480	
	u	66.81433419784980	
	i		67.06023556529500
2_175_chisihiikinaahtikw- h	ii	59.12780430928990	
	i		63.53382632867300
2_176_wiiyisht-h	ii		65.8304898390836
	i	63.51333924104760	
2_184_miiinaahtikw-h	ii	62.11160323984530	
	aa	63.04760063275680	
	i		63.92915476253380

			0
2_191_iiyimiichiiwaahp-h	ii	64.86819275655630	
	ii		65.99039152086830
	aa	64.94517971155880	
2_200_nisk-h	i		56.37492689029510
			0
2_206_iyik-h	i		60.3896546931897
	i	57.262861010744400	
2_208_mishtikuwit-h	u		58.12859948872590
Average		62.9122055635697	65.8991781342597

LBS average intensity on final and non-final vowels in words with final plosives

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_004_uut	u		65.89693570066740
1_021_uwaatinikuhp	u	59.30049924223480	
	aa	65.80864865088970	
	i		65.96087232557040
1_023_mitukihp	i	55.14750994073370	
	u		60.22474346210940
1_024_miiwit	ii		67.6386680397608
	i	66.86966598311770	
1_026_chaachishaapaaya aukuhp	aa	66.01855381777550	
	aa		69.7814577586566
	aa	63.634856203523600	
1_034_uschikimikw	u	48.966455592325300	
	i	64.15842207132760	
	i		70.5070121524929
1_043_waat	aa		70.45860476047870
1_045_iitaamiskimikw	ii	57.97035264201800	
	aa		68.80382507227470
	i	66.49942544405230	
1_049_chiipiikimikw	ii	64.92692866330220	
	ii	64.65075365839210	
	i		68.19387553151910
1_052_akhup	a		60.31915348373280
1_053_misinihiikinaachini	aa		69.74923184138310
	i	65.0343949970399	

wit	i	64.08651586337200	
1_061_wiikhwaayaaukuhp	aa		75.13391128164840
	aa	73.92334022715240	
	u	51.38578484667550	
1_062_iiyimiichiwaahp	i		72.070942134719
	ii	69.02002483969610	
	aa	63.340154464240300	
1_069_miinaahtikw	ii	65.70168840802750	
	aa		67.6710802149265
1_071_piishaakinikuhp	aa	65.01146954154480	
	i	63.84578173761290	
	i		66.39157347779620
1_094_shuwiyaaniwit	u	65.69098538278710	
	aa		72.29271108356060
	i	64.21448168730210	
1_098_aamiiukihp	aa	63.6328039347341	
	ii		71.79132177332290
	u	60.05129163371960	
1_104_chishaayaakwaapit	aa	66.25174031614290	
	aa		68.6366556444975
	aa	67.7074215345988	
1_123_nipaaukimikw	i	61.63448234643130	
	aa		71.09139421706800
	i	67.39702865403740	
1_145_miichisuukimikw	ii	59.417744646316500	
	uu		68.16019517724120
	i	66.28506809551300	
1_166_mishtikw	i	58.277024966340800	
	i		68.15424742206110
1_169_niimaawiniwit	aa		68.13090677058140
	i	67.55713556665420	
	i	63.59809367915800	
1_172_chimuwinikuhp	i	60.14933568839140	
	u		71.90810270188060
	i	67.98385956863800	
1_176_wiisht	ii		65.23075374945610
	i	64.42223860484200	
1_178_astaasuukimikw	aa	66.30433881802130	
	uu		67.39549436874130
	i	64.53756304460530	

1_185_shuwiyaanikimikw	aa		69.59086294077820
	i	65.44618682962770	
	i	66.46573351362680	
1_193_chiipiimishtikuwit	i	55.08307334570030	
	u		65.25993837853800
1_196_chiskutimaatuukimikw	aa		68.14916185302080
	uu	62.6695470528551	
	i	66.39808737841290	
1_208_kishkichaau_mishtikuwit	i	55.978248900188600	
	u		61.8515082944116
2_004_uut	uu		62.35060440933830
2_021_uwaatinikuhp	aa		68.18659439836830
	i	66.16982957145320	
2_023_mitukihp	i	56.06423231815860	
	u		58.27015068321130
2_024_miiwit	ii	65.2681494852625	
	i		66.06085530503950
2_026_chaachishaapaayaakuhp	aa	63.003385662502400	
	aa	68.07906640371100	
	aa		68.23117799820490
2_034_uschikimikw	i	64.73264339498430	
	i		65.17888527289520
2_038_iiyiyiukimikw	ii	63.73598331845900	
	u		69.3151976107821
	i	65.8850899518376	
2_043_waat	aa		69.26372103944740
2_045_iitaamiskimikw	ii	57.94156170403390	
	aa		68.42834735403850
	i	64.33533275095320	
2_049_chiipiikimikw	ii	64.09602795664480	
	ii		68.36323615453370
	i	65.36067036795180	
2_052_akuhp	a		58.23186707796760 0
2_053_misinihiikinaachiniwit	ii		64.95946780694720
	aa	64.32600215317290	
	i	63.01663878819350	
2_060_astaasuukimikw	aa	64.78032122784670	
	uu	61.56467151775690	

	i		65.6028817289622
2_061_wiikhwaayaaukuhp	ii	58.99654523122100	
	aa	69.87890292883550	
	aa		71.08152330894830
2_062_iiyimiichiwaahp	i		67.33456270476010
	ii	67.21329219137130	
	aa	60.95795604726330	
2_069_miinaahtikw	ii	62.78125080340400	
	aa		62.95839858525570
2_071_piishaakinikuhp	ii	56.591493907996000	
	aa	64.18273670284870	
	i		64.43710556522920
2_094_shuwiyaaniwit	u	64.3343688340587	
	aa		65.88367598991890
	i	62.103046301976600	
2_098_aamiiukihp	aa	59.293571876555000	
	ii		67.80122587279800
	u	56.242052130517100	
2_104_chishaayaakwaapit	aa	62.94567468693350	
	aa	64.24859933505360	
	aa		67.54218127237980
2_111_shiipaachipiyuwiku hp	aa		65.04974133785240
	i	63.62386731732030	
	u	58.41260785133710	
2_116_chisihiikinaahtikw	ii	60.474494952216500	
	i		61.97526179670050 0
2_123_nipaaukimikw	aa		66.74332482837890
	u	59.606723872582400	
	i	64.76917494828290	
2_129_nimihtinikaat	i		63.97856757374140
	i	61.33940112472360	
	aa	56.016112938835100	
2_145_miichisuukimikw	ii	55.44063182159350	
	uu	59.03098485691390	
	i		60.98583909210470
2_166_mishtikw	i		64.55544221332280
2_169_niimaawiniwit	aa		68.22515372098230
	i	66.5224308390727	
	i	63.63463835028480	

2_178_astaasuukinikw	a	62.60382009884470	
	uu	63.20934689465260	
	i		63.66824302808850
2_185_shuwiyaanikinikw	aa	65.14936798442330	
	i	63.588648472743100	
	i		67.09160953079520
2_193_chiipiimishtikuwit	i	49.75428044351890	
	u		60.10857651281910
2_196_chiskutimaatuukim ikw	aa		64.45916338346390
	uu	64.15013255270290	
	i	63.01169536627420	
Average		62.836110872402	66.7127954128362

LBS average intensity on final and non-final vowels in words with final vowels /+h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
1_002_piskustihchaau-h	u		55.46541522993460
	aa	51.362807930122000	
1_015_kaanichii-h	aa		68.47100541028280
	ii	62.6515679170972	
1_025_uskaataayaapii-h	aa	67.57755881760440	
	aa		70.71583387686280
	ii	61.57454457702900	
1_032_mihtiwikii-h	i		71.39220082083400
	ii	65.25799034513640	
1_042_maaskiniu-h	aa	60.80605576452840	
	i		66.18707987946850
	i	64.29860648579880	
1_044_kishkichaau-h	i	59.5228674138595	
	aa		68.34453148784820
	u	59.2547949518568	
1_076_miyiu-h	i		70.65538585131240
	u	69.00091801144250	
1_077_wichii-h	i	58.917697046480400	
	ii		64.62309087391540
1_081_iischiimaauschii-h	aa		69.44478809098150
	u	63.912073127079700	
	ii	64.54666685056250	
1_083_mishkushiu-h	i		61.22412688354990

1_097_miinaapuu-h	ii	66.37888388930450	
	aa		69.91389546453540
	uu	67.03466821689510	
1_101_mitihchii-h	i	60.23430293432970	
	ii		63.87249981074370 0
1_102_shikutaau-h	u	65.0069669846598	
	aa		69.08491263178070
	u	55.442679787013000	
1_125_uschihtaasiu-h	u	58.33332777047980	
	aa		70.09375576929760
	u	54.28296258610920	
1_133_upishtaahuyuu-h	aa		68.46299155379540
	u	66.93251568061920	
	uu	61.773718446959600	
1_138_siipii-h	ii	60.32551985807510	
	ii		64.09074098387890
1_140_aschii-h	ii		61.37768978505860
1_158_waau-h	aa		65.30139619503330
1_163_muushtaau-h	uu	60.8157645228238	
	aa		64.09108543898310
1_174_nichishkaatuu-h	i	57.972210182583700	
	aa		70.142345392476
	uu	64.97118501384980	
1_177_uniwii-h	u	66.44079075961450	
	i		67.67133510785630
	ii	59.6791878799106	
1_183_uskaataayaapii-h	aa		68.69097607868840
	aa	62.32427243023080	
	ii	60.71610084100770	
1_201_utimiskumaau-h	u		64.2741884153414
	aa	67.04110337712280	
	u	60.357541873351100	
1_202_uchischiwaahiicha au-h	ii	61.406321793518500	
	aa		64.97158693958980
	u	55.93348629134950	
1_215_chuuchuu-h	uu	60.86894303057420	
	uu		60.93292242824890
2_015_kaanichii-h	aa		67.24386004746090
	ii	62.32480727664190	

2_032_mihtiwikii-h	i		67.8032302777403
	ii	61.80083817922870	
2_042_maaskiniu-h	aa	59.83119101935190	
	i		65.6896727840293
	u	61.199063532392900	
2_044_kishkichaau-h	i	57.58990564245900	
	aa		67.49204988085960
	u	58.191119968269100	
2_076_miyiu-h	ii		66.16300711054070
	u	61.21512875455450	
2_077_wichii-h	i	58.36950429717810	
	ii		58.9370326050158
2_081_iischiimaauschii-h	ii	61.4888840780817	
	aa		66.05682500125970
	ii	60.96745756951930	
2_083_mishkushiu-h	i	56.29197018589720	
	u		59.7020821166028
2_097_miinaapuu-h	ii	64.44954843406630	
	aa		67.07544489754640
	uu	62.59230393295460	
2_101_mitihchii-h	i	54.77330698401280	
	ii		61.09217218559760 0
2_102_shikutaau-h	i	54.35749368332200	
	aa		64.72470952957540
	u	53.36723127586960	
2_124_wiichiyyiyiu-h	ii	55.22546864306340	
	ii		64.57764333169760
	u	59.64867896312510	
2_133_upishtaahuyuu-h	aa	63.98349770721010	
	u		64.53261495326620
	uu	56.45884839288460	
2_138_siipii-h	ii	59.22482668356090	
	ii		62.27782906578560
2_140_aschii-h	ii		59.62450984394040
2_183_uskaataayaapii-h	aa		65.7943641599256
	aa	64.87080750592110	
	ii	59.42812830994700	
2_201_utimiskumaau-h	u		61.66525770346470
	aa	61.21334637600920	

	u	53.449864919791300	
2_202_uchuschiwaahiich aau-h	u	63.692263676033300	
	ii	58.13519481204070	
	aa		65.278119544191
2_203_nichishkaatuu-h	u	55.628191776094900	
	aa		67.28720534552490
	uu	61.501283480413500	
2_215_chuuchuu-h	uu	54.55204491821900	
	uu		58.21206281917120
Average		60.596596990263	65.3494549689665

LBS average intensity on final and non-final vowels in words with final vowels

Filename	Segment label	Avg. int. non- accented	Avg. int. accented
1_013_miinaapuu	ii	67.99560087743230	
	aa		71.6401517130299
	uu	65.55048161247900	
1_014_muushtau	uu		63.02097748809520
	aa	59.888789378284300	
1_041_waau	aa		69.35113143988340
1_046_mitihchii	i		61.90121676338280
	ii	54.81335141638840	0
1_047_maaskiniu	aa	66.01494027244120	
	i		66.14388745752860
	i	56.875619361079700	
1_070_uniwii	u	65.82896118071900	
	i		70.20901244537000
	ii	60.50799632787160	
1_072_iischiimaauschii	aa		70.88252551676670
	u	65.39031317765810	
	ii	58.479933242915300	
1_106_chuuchuu	uu		63.53293455005020
	uu	57.2459130521757	
1_141_niwiichiiyiyiu	i	66.35585836415530	
	ii		67.88133068474000
	u	63.12292457271340	
1_148_mihtiwikii	i		65.52179100560920

	ii	59.275246523290700	
1_150_utimiskumaau	u		63.04820521092060
	aa	61.74468268245910	
	u	49.70942868251880	
1_153_uchischiwaahiicha au	aa		67.25519078479480
	ii	63.469945290965800	
	aa	56.663922960250400	
1_160_upishtaahuyuu	aa		67.87699114164940
	u	64.6312230583839	
	uu	53.619368896738600	
1_164_wichii	i	60.09277649526260	
	ii		60.64603420913290 0
1_167_uskaataayaapii	aa		66.76151360253150
	aa	60.57353350681360	
	ii	54.16548394333350	
1_180_siipii	ii		66.85102746187560
	ii	62.460149156544200	
1_181_piskustihchaau	aa		59.47680355441940 0
1_187_shikutaau	i	53.788174945971000	
	u		59.46734222272900
	aa	56.66430846669540	
1_189_miyiu	ii		69.93819967941760
	u	57.14033414147450	
1_192_aschii	a	57.835510706040400	
	ii		59.49071861273340 0
1_194_kaanichii	aa		66.47018849881970
	ii	57.002537099544800	
1_198_mishkushiu	u		60.45374029016170 0
1_213_uschihtaasiu	u	57.998298247182100	
	aa		69.84472785379730
	u	52.36808326060500	
1_214_uskaataayaapii	aa		67.19331588941180
	aa	59.41703360748070	
	ii	54.278957443421700	
2_002_piiskustihchaau	u	52.66617143503340	

	aa		60.24266309347920 0
2_013_miinaapuu	ii	67.98668502631280	
	aa		71.55672031844740
	uu	66.01927918932010	
2_014_muushtaa	uu		60.25716471020990
	aa	57.25502636617050	
2_041_waau	aa		65.55432632664400
2_046_mitihchii	i		58.80497740655420
	ii	57.098447793197900	
2_047_maaskiniu	aa	61.697681468565	
	i		63.52592621263740
	i	59.41302919720280	
2_070_uniwii	u	62.296216702982400	
	i		65.13325035040530
	ii	54.67964357660770	
2_072_iischiimaauschii	ii	62.63070918439850	
	aa		66.16603641757560
	ii	58.785004864381400	
2_106_chuuchuu	uu		58.62901276618300 0
	uu	52.3790728613257	
2_125_uschihtaasiu	u	56.65991709895340	
	aa		62.59899280841530
	u	51.81376406663120	
2_141_niwiichiiyiyiu	ii	58.004503620340400	
	ii		64.45725337777020
	i	60.134039634995100	
2_180_siipii	ii	58.353783798657700	
	ii		60.76110033473080 0
2_181_piskustihchaau	aa		60.82447514709900
2_187_shikutaau	i	56.00981795285820	
	u	57.48983262643780	
	aa		63.67951680921970
2_189_miyiu	i		64.58482391671790
	u	58.69823756598870	
2_192_aschii	a		59.173772345724
	ii	58.4050889744491	

2_194_kaanichii	aa		63.92293078707870
	ii	55.50657888201970	0
2_198_mishkushiu	i		56.48525845969780
2_213_uschihtaasiu	u	53.44920556563780	
	aa		62.16690458776400
	u	53.230455852651200	
2_214_uskaataayaapii	aa		65.2599159186767
	aa	60.66428908897550	
	ii	53.42892554213960	
Average		58.7411032184326	64.2873631857246

JN average intensity on final and non-final vowels in words with final affricates / +h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_051_piisimuhkaanich-h	ii	77.52644514436640	
	u		79.51522857789430
	aa	76.89308191062220	
3_204_kuskusch-h	u		79.15227183723720
3_209_kaawaastaanikihc hichaapiyich-h	i	74.92397634486500	
	aa		76.82039337134830
	i	75.69050258599690	
Average		76.2585014964626	78.4959645954933

JN average intensity on final and non-final vowels in words with final affricates

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_020_kuskusch	u		79.85671386362910
3_082_kaawaastaanikihc hichaapiyich	i		73.79851227689530
	aa	73.03021037683800	
	i	72.19738885530620	
3_096_wiich	ii		74.56749489471110
Average		72.6137996160721	76.0742403450785

JN average intensity on final and non-final vowels in words with final continuants / +h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_010_uhkumis-h	u	72.38292426111280	
	u		79.37726680096900
3_017_ukushish-h	u	71.97070630607170	
	u		80.07972962050050
3_027_muuhkamaanish-h	uu	77.17370683513510	
	u	76.23989514287720	
	aa		78.1129289611452
3_054_paashchishikinish-h	i	76.02641178770630	
	i		78.14053866603890
	i	76.53136998626410	
3_073_mitaas-h	i	75.94501506982580	
	aa		80.32383601566080
3_112_shiipiishish-h	ii		81.598733106313
	ii	80.41119570648300	
3_114_mishchikush-h	i		76.36034814067860
	i	70.84183912141490	
3_115_utaanis-h	u	73.34951588058230	
	aa		80.71265061821500
3_134_iiyiyukimikush-h	u	70.86428241096630	
	i		77.45974973456410
	i	71.33779385046650	
3_135_usikus-h	u		72.12189953229230
	i	69.61791861277620	
3_137_uchaapaanish-h	u	73.50173301944890	
	aa	74.2819826464181	
	aa		76.21578879155160
3_146_ukusis-h	u	64.95052929153730	
	u		76.6555809662181
3_182_saakihiikinipaaskush-h	ii	70.55346316863940	
	i		77.8944606339299
	aa	74.69029663874220	
3_199_wiitimus-h	ii	74.95057063717500	
	u		79.48488989158100
3_212_uchishkwaachihchiiish-h	a		78.73873192184320
	aa	76.4167132172059	
	ii	67.39604750094410	
Average		73.3063767186568	78.2184755601001

JN average intensity on final and non-final vowels in words with final continuants

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_011_muuhkumaanish	uu	77.24598710211330	
	u	75.443805082928	
	aa		77.34731768840970
3_016_uchaapaanish	a	74.54206140107430	
	aa	75.39678239136730	
	aa		77.31295220729030
3_018_muusuyaas	uu	76.45297493089970	
	u		77.12357204141640
	aa	72.22406061021490	
3_033_niwiitimus	i	78.38895254607340	
	i		81.61771454684990
3_040_nisikus	i		74.18085654624810
3_067_nihkumis	i		80.43293569457460
	u	77.54431681496440	
3_087_miinish	uu		83.19229803066510
3_099_shiipiishish	ii		81.36217526464650
	ii	77.70146458607650	
3_107_mitaas	i	72.71413325446640	
	aa		77.26861095900380
3_109_nitaanis	aa		81.70322967592480
3_120_nikushish	i	74.82856796659510	
	u		80.52699330573160
3_142_paashchishikinish	i	66.20405055289270	
	i	75.34710826759080	
	i		75.61959478383240
3_144_wiyaas	i	71.74399819459910	
	aa		74.10995669223670
3_151_mitaas	i	66.9748649383969	
	aa		74.3533820166619
3_159_apis	a	68.70184641640580	
	i		73.14671759237190
3_161_nikusis	i	73.68674094640100	
	u		79.59387027277860
3_168_uschishkwaachihiish	u		76.51401473765980
	aa	75.83065657206950	
	ii	68.58946717350270	

3_197_mishchikush	i		76.54085736128760
	i	68.71168388265470	
3_211_saakihiikinipaakush	ii	73.13971502728360	
	i		77.7464165298658
	aa	75.68975862247720	
Average		73.504681694593	77.8786034709187

JN average intensity on final and non-final vowels in words with final nasals / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_009_aaniskiwikinitihchaan-h	i	75.25644471009	
	i		77.02626205599580
	aa	76.10236128488280	
3_055_muuhkumaan-h	uu		79.37964319018700
	u	77.1842422974257	
	aa	77.4131833821139	
3_057_mihthikaan-h	i		77.66404457464980
	aa	77.43349338074770	
3_084_utiyyim-h	u	70.9157307959249	
	i		82.31855516741900
	i	81.81106425882870	
3_088_uhkum-h	u	71.63451003239280	
	u		79.72731304382530
3_091_chiimaan-h	ii	78.66637061364350	
	aa		79.72275295349410
3_103_paashtaumiichim-h	aa		79.19633394731860
	ii	75.74276225142490	
	i	78.09853236547100	
3_108_uskutim-h	u	72.00278061282320	
	u	75.1854559557732	
	i		81.46144461154280
3_118_umushum-h	u		79.86560306363090
	u	78.27272013041330	
3_128_utiwaashishiim-h	i		75.85266010371530
	aa	74.87841656744410	
	ii	73.94003488251310	
3_136_aatiyuuhkaan-h	aa	68.50497014237700	
	uu	71.12531232801320	
	aa		75.84938461818090

3_139_wiichishaan-h	ii	70.44952989967220	
	aa		72.43428443486870
3_143_miichim-h	ii	75.01502958042970	
	i		78.60645152121090
3_165_utaanishkiwishiim-h	aa		79.00905978758260
	i	75.28638801746620	
	ii	76.34593011494550	
3_205_piihtiwipichiwiyaan-aan-h	u		77.97521381504030
	aa	77.84042997757490	
	aa	77.84585270194030	
3_207_mitutisaan-h	i	72.81051598649170	
	u		76.08320066336250
	aa	68.15275342702810	
Average		74.9198006037635	78.2607629720015

JN average intensity on final and non-final vowels in words with final nasals

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_003_nitiyim	i	70.90552490746390	
	i		78.20903771992640
	i	77.79735003855580	
3_019_miichim	ii		77.13742404431280
	i	72.68298198229040	
3_031_mihitikaan	i		78.84481332683260
	aa	72.95693634875040	
3_035_paashtaumiichim	aa		76.36213354025040
	ii	72.36056580297230	
	i	71.2463292561981	
3_063_piisimiuhkaan	ii	75.49619332319980	
	i		77.99261221002470
	aa	68.10383890519630	
3_075_niichishaan	ii		79.44078663835270
	aa	76.61995270553790	
3_078_mitutisaan	i	74.9656311928864	
	u		77.67309384848630
	aa	71.07166436249650	
3_089_nuuhkum	uu		82.32880953048500
	u	69.97980233670210	
3_092_nitiwaashishiim	i	75.01418721096000	

	aa		77.21141490797
	ii	71.26043209318140	
3_095_nitaaniskutaapaam	u	74.44769723260560	
	aa		78.76141897577760
	aa	72.19758459300620	
	u		75.98312843816490
3_127_piihtuwupichiwiyaanaan	aa	75.65089516341860	
	aa		78.93495996911150
3_162_nitaanishkiwishiim	i	75.75794849397920	
	ii	71.51017826661270	
3_173_uskutim	u		78.95852763370870
	i	73.78143686353990	
3_188_chiimaan	ii	76.12042424783810	
	aa		76.1564777057568
3_190_aaniskiwikinitihchaan	aa	73.89923525794080	
	i		74.64313141769800
3_195_nimushum	aa	69.15276255876660	
	i		80.39045092525520
	u	78.59510817378270	
	aa	70.74461251635900	
3_210_aatiyuuhkaan	uu	76.54265522585790	
	aa		77.91427434598370
Average		73.4177665023115	78.0554408928293

JN average intensity on final and non-final vowels in words with final plosives /+h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_005_mitukuhp-h	i	77.3241352831038	
	u		78.18221348719650
3_006_niimaawiniwit-h	ii		77.53300213934750
	aa	75.2235346364929	
	i	71.75684381884590	
3_007_misinihiikinaachiniwit-h	i	73.41591085194480	
	aa		75.8629307245318
	i	72.1641283347164	
3_028_wiisht-h	ii		76.62467863361380
	i	76.1238589318024	
3_029_maschisk-h	a	72.38310255382980	

	i		74.10576514732350
3_036_chaachishaapaaua	aa	76.0918710244494	
aukuhp-h	u	70.10308961255610	
	u		79.25593450728440
3_039_uschikimikw-h	u	77.7572400214163	
	i	72.86406377588970	
	i		79.78597395867240
3_048_waat-h	aa		77.44160168256820
3_050_shuwiyaaniwit-h	i		78.362851488179
	aa	77.80796055279910	
	i	74.77103877548340	
3_056_chiskutimaatuukim	uu	75.05367169184610	
ikw-h	aa		77.03369820553650
	i	70.58151136634180	
3_066_chimuwinikuhp-h	i	77.87499768389360	
	i		78.79913458113450
	i	71.18769855526880	
3_068_piishaakinikuhp-h	aa	73.76322679393990	
	i		76.86772679922530
	i	72.3049478319649	
3_074_shuwuyaaniikimikw	aa		81.36003844274950
-h	i	78.3796836169482	
	i	80.7773666905852	
3_079_akhup-h	a		74.82276366656870
3_085_uschisk-h	u	75.95900705454480	
	i		79.66533067032730
3_100_wiikhwaayaaukuhp	aa	75.61209969380000	
-h	aa		77.24237318288930
	u	69.9160012866944	
3_110_shiipaachipiyuwiku	i	68.63149477471050	
hp-h	i		77.94184790548040
	u	71.04410510873560	
3_113_mishtikuwit-h	i	70.7767391596019	
	i		77.91715717853770
3_119_panikik-h	a		75.23650289995840
	i	69.81429413308110	
	i	73.99709303449070	
3_131_mishtikw-h	i	75.7019599515003	
	i		76.19888192384890
3_132_chiipiikimikw-h	u	69.92745873929040	

	i		75.4817668627896
	i	73.2288998554977	
3_149_uut-h	uu		79.77088124774660
3_155_uwaatinikuhp-h	aa	72.34828821343530	
	i		76.60539217420400
	i	74.17437180974220	
3_156_miiwit-h	ii		80.25550348081070
	i	77.03286473546800	
3_157_chishaayaakwaapit-h	aa	70.9239403129565	
	aa		71.40310023209350
	i	70.07423349594060	
3_170_miichisuukimikw-h	ii		80.09117393435950
	uu	77.62971740374790	
	i	79.11089084647440	
3_171_nipaaukinikw-h	aa		79.09575951164220
	i	70.65020756016300	
	i	77.29418846063450	
3_184_miinaahtikw-h	ii		81.40051297280200
	aa	76.8630819703365	
	i	71.1907641704807	
3_200_nisk-h	i		76.4452839340672
3_206_iyik-h	i		75.48261078631350
	i	72.64859026229930	
3_iiyimiichiiwaahp-h	ii		76.0298900915757
	i	75.61477719320710	
	aa	73.35630529470330	
Average		73.9398099331664	77.4936220146251

JN average intensity on final and non-final vowels in words with final plosives

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
3_004_uut	uu		79.32048216900750
3_021_uwaatinikuhp	aa	75.31252696657750	
	i	72.89273460724420	
	i		75.61497951917220
3_023_mitukihp	i	72.2802558405235	
	i		77.7953299752495
3_024_miiwit	ii		80.95107355280220
	i	75.8008794663247	

3_026_chaachishaapaaya akuhp	aa		77.21708327131160
	aa	74.67754097514190	
	aa	73.83170553031710	
3_034_uschikimikw	u	74.21690770712690	
	i	67.91641963866530	
	i		83.59682020625990
3_038_iiyiyukimikw	uu	79.48282275001350	
	u	74.74358664885190	
	i		81.1426325034008
3_043_waat	aa		78.12759734299690
3_045_iitaamiskimikw	ii	70.89991192651350	
	aa		79.4359912834447
	i	77.3706525389203	
3_049_chiipiikimikw	ii	79.78780173144090	
	u	68.77540107234060	
	i		79.83822501141250
3_052_akhup	a		73.0004695944944
3_053_misinikiikinaachini wit	aa		77.75002099940890
	i	71.29283364225060	
	i	75.46115752064280	
3_061_wiikhwaayaaukuhp	aa		75.1306592853594
	u	68.64956374279340	
	u	68.47283543605590	
3_062_iiyimiichiwaahp	ii		75.91696802820490
	i	70.58901915736960	
	aa	63.370759928527500	
3_069_miinaahtikw	ii		81.04119158701200
	aa	79.89393004544620	
	i	72.2490586420161	
3_071_piishaakinikuhp	aa	74.2408369998679	
	i		76.93922763770610
	i	74.17417434974360	
3_094_shuwiyaaniwit	u	76.79939859310300	
	aa		79.29182662095540
	i	73.33627329560930	
3_104_chishaayaakwaapit	aa	73.95773848055700	
	aa		77.60564194576620
	i	75.86460431433030	
3_111_shiipaachipiyuwiku	i	68.4201386149113	
	i	73.54383821912420	

hp	u		76.16688721541780
3_123_nipaaukimikw	aa		79.40096206139600
	i	77.88105768425040	
	i	70.55922401465660	
3_129_nimihtinikaat	i		80.32975179313570
	u	72.65137658644500	
	aa	72.87837331603960	
3_130_iyik	i		76.51862665868480
	i	75.1592202377969	
3_145_miichisuukimikw	uu	69.04435084076280	
	i		74.91402057987350
	i	65.95725374185440	
3_166_mishtikw	i		76.28559084001930
	i	74.50148408342240	
3_169_niimaawiniwit	ii		82.4873942424929
	aa	79.15967784614190	
	i	69.30862967487470	
3_172_chimuwinikuhp	i	73.9043924201597	
	i		79.31328056181010
	i	74.89070824888680	
3_176_wiyyisht	ii		77.92013505921680
	i	74.01649144087110	
3_185_shuwiyaanikinikw	aa		76.12172920422030
	i	75.62388783636620	
	i	76.03901206385810	
3_193_chiipiimishtikuwit	i	74.25556198517460	
	i	65.12775797452260	
	u		74.38746633485520
3_196_chiskutimaatuukim ikw	uu	72.41981298970640	
	i		78.50820406871600
	i	69.38909588722290	
3_208_mishtikuwit	i	66.31205343666870	
	u		72.12660654624100
Average		72.9476946138406	77.8773185709692

JN average intensity on final and non-final vowels in words with final vowels / + h/

Filename	Segment	Avg. int. non-	Avg. int. accented
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	label	accented	
3_015_kaanichii-h	aa		75.94526589904150
	ii	68.5723156840076	
3_025_uskaataayaapii-h	aa	74.15122386381030	
	aa	74.04037906773020	
	ii		75.12553951491600
3_032_mihtiwikii-h	i		82.54796081217760
	ii	78.76099477601680	
3_042_maaskiniu-h	aa		80.11814757886520
	i	78.28263065657650	
	u	75.80527154402350	
3_076_miyiu-h	i		82.10979950142320
	i	74.47785489391030	
3_077_wichii-h	ii	72.37236813641260	
	ii		76.7585672756282
3_081_iischiimaauschii-h	ii		80.2219211711194
	aa	76.8248541027479	
	ii	72.32350471910770	
3_083_mishkushiu-h	i		79.03444129123080
	u	77.87909278838090	
3_097_miinaapuu-h	ii		79.83982205082400
	aa	76.81013238397910	
	uu	64.64230025044010	
3_101_mitihchii-h	i	76.69059691325780	
	ii		76.90502643431760
3_102_shikutaau-h	u	74.16798679011990	
	aa		78.97292675339950
	u	74.15503250577580	
3_124_wiichiyyiyiu-h	aa		79.03732415572680
	ii	78.16840679328810	
	u	76.72687224928870	
3_138_siipii-h	ii	74.21198215847670	
	ii		76.13855680024500
3_140_aschii-h	a	67.0567106138623	
	ii		73.17087454471010
3_158_waau-h	aa		72.26887927646580
3_163_muushtaau-h	uu		80.50214813452050
	aa	65.51030781700000	
3_174_nichishkaatuu-h	aa		73.73918572032230
	uu	73.39432796892630	

3_177_uniwii-h	u	74.97980072750160	
	i		80.69707155165770
	ii	74.28865055209590	
3_183_uskaataayaapii-h	aa		77.69699932269220
	aa	75.96827026937500	
	ii	73.47777411597920	
3_201_vowel-h	i	75.38940333916420	
	a		77.19398169987890
	i	68.53871577355370	
3_202_uchuschiwaahiicha au-h	i		74.9992906124519
	aa	70.98884000577230	
	aa	60.312435951553200	
Average		73.2989679137378	77.7630347667435

JN average intensity on final and non-final vowels in words with final vowels

Filename	Segment label	Avg. int. non- accented	Avg. int. accented
3_013_miinaapuu	ii		79.51813423672960
	aa	78.2831400412867	
	uu	68.08274628540150	
3_014_muushtaa	uu		79.36363497962100
	aa	68.4788943019922	
3_041_waau	aa		70.14760247717950
3_046_mitihchii	i	75.4363644295174	
	ii		76.80650056919750
3_047_maaskiniu	aa		78.55435720844860
	i	76.5298401953171	
	u	76.37138147947470	
3_070_uniwii	u	74.86978317158360	
	i		80.47802728786190
	ii	67.71604007733890	
3_072_iischiimaauschii	ii	82.3335608336152	
	aa		82.88725399222240
	ii	69.81559858534410	
3_125_uschihtaasiu	i		77.71405302112470
	i	72.89415434364300	
	i	64.98130770577380	
3_141_niwiichiyyiyiu	i		77.0247722871719
	ii	76.85969841398890	

	u	68.35975897851190	
3_148_mihtiwikii	i	79.69149026755630	
	i		80.88216500283650
	ii	69.68334837922450	
3_150_vowel	a	76.71726260181050	
	a		79.42165876910520
	i	74.21902529875930	
3_153_uchischiwaahiicha au	i		78.13928178542680
	a	73.06167631927470	
	aa	68.03348336752440	
3_164_wichii	i		72.08576358972860
	ii	67.55184077168560	
3_167_uskaataayaapii	aa		75.41617396566290
	aa	74.48533500941100	
	ii	66.7368023134253	
3_180_siipii	ii		78.37950445612980
	ii	72.49228528619900	
3_181_piskustihchaau	i		77.76757653907600
	u	72.92484949471730	
	aa	65.99482385630120	
3_187_shikutaau	u	71.21731229789780	
	aa		75.77925511015620
	u	70.64413852601810	
3_189_miyiu	i		81.08556858372580
	u	73.77915437095600	
3_192_aschii	a	73.59247040393970	
	ii		74.97593832316750
3_194_kaanichii	aa		79.15732267176020
	ii	72.88483976700140	
3_198_mishkushiu	i		77.37923522891590
	i	75.58425387961330	
3_214_uskaataayaapii	aa		76.90626686594890
	a	75.17826012319670	
	i	61.96339177709430	
Average		72.2778915574822	77.721365770509

MN average intensity on final and non-final vowels in words with final affricates / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_051_piisimuhkaanich-h	ii		78.78210223670680
	i	78.0222074478111	
	aa	77.95502713127170	
5_154_wiich-h	ii		78.54598113724760
5_209_kaawaastaanikihc hichaapiyich-h	aa		76.88676277449770
	aa	74.73843076709170	
	i	76.29934192390090	
6_051_piisimuhkaanich-h	ii		78.56845397304900
	i	78.01840746843480	
	aa	78.06637270837760	
6_154_wiich-h	ii		78.68074058116570
6_209_kaawaastaanikihc hichaapiyich-h	aa		76.93504371514490
	a	74.59834105429680	
	i	75.91193273157210	
Average		76.7012576540946	78.0665140696353

MN average intensity on final and non-final vowels in words with final affricates

Filename	Segment label	Avg. int. non-accented	Avg. int. non-accented
5_082_kaawaastaanikihc hichaapiyich	i		77.61176202460500
	aa	76.82722945337040	
	i	76.92873557202590	
5_096_wiich	ii		79.3865855379846
6_082_kaawaastaanikihc hichaapiyich	i	74.44081845463920	
	aa		78.70857438666550
	i	76.70984548577690	
6_096_wiich	ii		78.96536498566510
Average		76.2266572414531	78.66807173373

MN average intensity on final and non-final vowels in words with final continuants / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_010_uhkumis-h	u	74.35650765198100	
	u		79.23875527524020
5_017_ukushish-h	u	73.53709829284840	
	u		78.2975866254398
5_027_muuhkamaanish-h	uu	78.06660391619930	
	u	74.73859744184250	
	aa		79.42125005994140
5_054_paashchikinish-h	aa	76.51126886322980	

	i	79.00546028066350	
	i		79.70918094218910
5_073_mitaas-h	i	73.02049191214930	
	aa		76.68099393082820
5_112_shiipiishish-h	ii	77.50936099636340	
	ii		78.36636845424530
5_114_mishchikush-h	i	78.61394410336920	
	i		81.27145880840210
5_115_utaanis-h	u	71.27117554628290	
	aa		78.7076939456464
5_117_miinish-h	ii		80.99645669524770
5_134_iiyiyiukimikush-h	ii	78.07390675638980	
	u		81.48335517099950
	i	80.60692867311500	
5_135_usikus-h	u	76.02135910425390	
	i		76.4068811650733
5_137_uchaapaanish-h	aa	77.75296624586660	
	aa		79.03733996386180
	i	71.71383479150730	
5_146_ukusis-h	u	76.1722021788208	
	u		81.67708161646960
5_182_saakihiikinipaasku	aa	75.60841954078730	
sh-h	i		77.49569341633250
	aa	72.93764149617580	
5_199_wiitimus-h	ii	74.00327213633320	
	i		78.41229571512120
5_212_uchishkwaachihchi	i	70.22429040096590	
ish-h	aa	73.32799751299240	
	ii		77.5249688532517
6_010_uhkumis-h	u	73.39661360953390	
	u		79.37432028584510
6_017_ukushish-h	u	74.32880384706890	
	u		79.64787400555530
6_027_muuhkamaanish-h	uu	78.24333193988310	
	aa		78.7000546886598
6_054_paashchikinish-h	aa	77.67591889711800	
	i	78.01716192428690	
	i		79.04241155748120
6_073_mitaas-h	i	71.1851984324234	
	aa		76.23344285614520
6_112_shiipiishish-h	ii	79.074061685161	
	ii		79.36869396341140
6_114_mishchikush-h	i	77.29933192307720	
	i		79.44115396742090
6_115_utaanis-h	u	73.00806398175340	
	aa		78.30184317215360
6_117_miinish-h	ii		78.69004548646580
6_134_iiyiyiukimikush-h	ii	78.30567898820280	

	u	77.15011687325110	
	i		79.69879680999660
6_135_usikus-h	u	76.02654395844940	
	i		78.77622844859630
6_137_uchaapaanish-h	aa	77.73510518517860	
	aa		80.35552449986080
	i	71.083761897926	
6_146_ukusis-h	u	74.11443665527350	
	u		81.15091747476650
6_182_saakihiikinipaasku sh-h	i		78.46646049101400
	i	77.61262248576450	
	aa	75.769756640485	
	ii	76.2279937219512	
6_199_wiitimus-h	i		77.82697812240770
	i		
6_212_uchishkwaachihchi ish-h	i	68.70390987675310	
	aa	72.74027178463600	
	ii		74.40576896756480
Average		75.3846832231784	78.8814961073636

MN average intensity on final and non-final vowels in words with final continuants

Filename	Segment label	Avg. int. non- accented	Avg. int. accented
5_011_muuhkumaanish	uu	71.38079786531990	
	u	77.21211749295240	
	aa		79.71082818232490
5_016_uchaapaanish	u	73.58744050829460	
	aa	75.49199291206440	
	aa		78.72604066488730
5_018_muusuyaas	uu	78.02264764156820	
	uu		78.93109981643010
	aa	72.90014092820800	
5_033_niwiitimus	i	74.32686606786230	
	i		79.48531239675540
5_038_iiyiyiukimikw	ii	76.72802754677850	
	u	74.91031848916200	
	i		79.12806770328220
5_040_nisikus	i	74.02953893070550	
	i		75.2875948401834
5_067_nihkumis	i	75.43137676619780	
	u		80.0737492361345
5_087_miinish	ii		81.25090169581610

5_099_shiipiishish	ii		78.92418902756000
	ii	76.3372875611685	
5_107_mitaas	i	74.77860037374950	
	aa		75.24657186546840
5_109_nitaanis	aa		78.27366978027750
5_120_nikushish	i	70.01297890429040	
	u		79.20590106283330
5_142_paashchishikinish	aa	77.21167013557080	
	i	75.24249022079860	
	i		80.2273022879375
5_144_wiyaas	i		79.15045366352660
	aa	76.90775256567560	
5_161_nikusis	i	74.74767223254430	
	u		80.01414289358900
5_168_uschishkwaachihiish	i	70.95248429599410	
	aa		79.52048014184780
	ii	76.50042176061760	
5_197_mishchikush	i		76.20822449608400
	i	75.5925571410317	
5_211_saakihikinipaakush	ii	76.17390489351520	
	i		77.59522878740330
	aa	73.02446549709310	
6_011_muuhkumaanish	uu	73.74600404085470	
	u	76.39652482884860	
	aa		79.30906097036650
6_016_uchaapaanish	u	73.83075369869020	
	aa	75.94224558500170	
	aa		78.92740122679510
6_018_muusuyaas	uu		79.58340279593900
	u	77.21887637096100	
	aa	74.40881886511520	
6_033_niwiitimus	i	78.05227160322320	
	i		79.6535509011534
6_038_iiyiyiukimikw	i	76.30843721782180	
	i	73.35306873279070	
	i		78.73162121051430
6_040_nisikus	i	72.31624040113830	
	u		73.9202642008729
6_067_nihkumis	i	75.78147795579460	
	u		78.93933728154570

6_087_miinish	ii		81.00542149279370
6_099_shiipiishish	ii		79.79135334487130
	ii	75.73794608879620	
6_107_mitaas	i		78.66404226155720
	aa	73.66100823682430	
6_109_nitaanis	aa		77.76290587204920
6_120_nikushish	i	71.60456350022070	
	u		81.07267731784110
6_142_paashchishikinish	aa	76.37103977380480	
	i	76.31497487311160	
	i		80.75417677564920
6_144_wiyaas	i		79.30785031423630
	aa	76.08239971129990	
6_161_nikusis	i	73.54099272170140	
	u		80.411069028609
6_168_uschishkwaachihiish	u	73.95879527979690	
	aa		76.11856108453470
	ii	75.02382030601780	
6_197_mishchikush	i	76.58894905274180	
	i		77.17313095815930
6_211_saakihiikinipaakush	ii	74.36845974317970	
	i		78.21685683376990
	aa	74.20523845323800	
Average		74.9199229950464	78.7861789559333

MN average intensity on final and non-final vowels in words with final nasals / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_055_muuhkumaan-h	uu	77.77818228244290	
	u	74.95612532116160	
	aa		79.7890600845827
5_057_mihtihkaan-h	a	76.13210082058030	
	aa		79.38400353074140
5_064_usisim-h	u	77.31172323629320	
	i		79.62570584503810
5_084_utiyiyim-h	u	76.66181419950650	
	i		79.64880148750210
	i	79.62081486791920	
5_088_uhkum-h	u	74.35003030056010	

	u		81.85993769718310
5_091_chiimaan-h	uu		79.65627558551030
	aa	77.29868734067040	
5_103_paashtaaumiichim-h	aa	77.93699468426270	
	ii	77.85919787076490	
	i		79.5271842075134
5_108_uskutim-h	u	72.3794998522346	
	u	75.50732134570890	
	i		81.08454848564240
5_118_umushum-h	u	73.67890845288610	
	u		78.36491619342360
5_128_utiwaashishiim-h	u	67.5834141148312	
	aa	76.42518793410350	
	ii		79.52393427829620
5_136_aatiyuuhkaan-h	uu		79.93444807484850
	aa	78.96411295081620	
5_139_wiichishaan-h	ii	73.30341180976740	
	aa		78.11131836244010
5_143_miichim-h	ii	79.05106581370980	
	i		80.06958296180690
5_152_pipunikaan-h	u		78.37148171145120
	i	72.07205286231050	
	aa	77.68795496823360	
5_165_utaanishkiwishiim-h	aa	78.18255291750090	
	i		79.00981843382360
	ii	78.52474584061190	
5_205_piihtiwipichiwiyaan aan-h	i	69.5405783505532	
	i		79.35569266452430
	aa	77.26498297417720	
5_207_mitutisaan-h	i	70.47438698287650	
	u	74.28108166993190	
	aa		75.30384884923680
6_055_muuhkumaan-h	uu	75.94502421284600	
	u	74.46912847005380	
	aa		79.947634133032
6_057_mihtihkaan-h	i	76.00078135736970	
	aa		78.97852640659620
6_064_usisim-h	u	76.08157502044330	
	i		79.84477225561230
6_084_utiyiyim-h	u	72.7530373277671	

	i		79.72997862541960
	i	79.12387390773100	
6_088_uhkum-h	u	77.17244410661800	
	u		81.42855027323500
6_091_chiimaan-h	ii		79.51925461402080
	aa	77.9017369174733	
6_103_paashtaaumiichim-h	aa	76.79999563497190	
	ii	77.09709879600300	
	i		79.26160006092480
6_108_uskutim-h	u	74.31729737242830	
	u	72.18235834431490	
	i		79.78512447426490
6_118_umushum-h	u	73.10703511846880	
	u		79.277444870687
6_128_utiwaashishiim-h	i	75.87784891412310	
	aa	76.41977294854520	
	ii		77.95446999311270
6_136_aatiyuuhkaan-h	i		80.61479373345630
	uu	77.54868593534400	
	aa	79.00679057748590	
6_139_wiichishaan-h	ii	76.18421109291170	
	aa		78.85994630327760
6_143_miichim-h	ii	74.35531902277520	
	i		80.73559227672220
6_152_pipunikaan-h	u	77.55250844409380	
	i		77.96019750251160
	aa	77.62256629445570	
6_165_utaanishkiwishiim-h	aa	77.51655824741650	
	i		79.26268401662430
	ii	78.33909842318780	
6_205_piihtiwipichiwiyaan aan-h	i		77.97683368027190
	aa	75.80676966524180	
	a	76.78647559953090	
6_207_mitutisaan-h	i	70.32900990746090	
	u		76.33917544516290
	aa	75.25042901721810	
Average		75.7806483102018	79.2969746211323

MN average intensity on final and non-final vowels in words with final nasals

Filename	Segment label	Avg. int. non- accented	Avg. int. accented
5_003_nitiyim	i	79.7301335913052	
	i		79.91434276117960
5_012_pipunikaan	u		78.70980937807110
	i	70.85544329852170	
	aa	76.22020865528960	
5_019_miichim	ii		80.65550731621090
	i	77.40332729892930	
5_030_muuhkumaanish	uu		79.90873430084950
	u	76.6116543818768	
	aa	75.86033008285420	
5_031_mihtihkaan	i	74.61192139926580	
	aa	75.54976274362320	75.54976274362320
5_035_paashtaaumiichim	aa		78.04034279956040
	ii	76.75665997200710	
	i	77.77153698337470	
5_063_piisimiuhkaan	i	74.84002024609680	
	i		76.74111763970650
	aa	74.7778082976461	
5_075_niichishaan	ii	75.72303634874730	
	aa		76.42552859501430
5_078_mitutisaan	i	69.53328243689790	
	u		77.237422459441
	aa	74.22535443680470	
5_089_nuuhkum	uu	78.45717612931090	
	u		78.75899858848710
5_092_nitiwaashishiim	aa	77.9935191972751	
	ii		78.09598238076640
5_095_nitaaniskutaapaam	u		77.98476625183020
	aa	77.09042375840560	
	aa	74.50742904938910	
5_126_nisisim	i		77.65090354946360
	i	76.13676982868810	
5_127_piihtuwupichiwiyaanaan	i	77.02482669300540	
	i		80.78106450770180
	aa	72.64836197795760	
5_162_nitaanishkiwishiim	aa	78.55078220981800	

	i	79.28948609520660	
	ii		76.65374705333790
5_173_uskutim	u	78.24287753850400	
	u		81.49077057310630
	i	79.26046297982280	
5_188_chiimaan	ii		78.1764136413616
	aa	73.19183792688360	
5_195_nimushum	i		78.82723359951860
	u	75.95474507626110	
5_210_aatiyuuhkaan	i	79.36961429446140	
	uu		80.40506794926790
	aa	74.06483624336070	
6_003_nitiyim	i	75.79362046221750	
	i		79.62051942176360
	i	79.4280009770483	
6_012_pipunikaan	i	76.63233011521720	
	u		79.03386357555080
	aa	75.19571252853470	
6_019_miichim	ii		79.56911907720190
	i	78.93065005323080	
6_030_muuhkumaanish	uu		79.84694812858370
	u	75.24320559269830	
	aa	75.89537191641320	
6_031_mihtihkaan	i		76.7346600084239
	aa	75.61296578227370	
6_035_paashtaaumiichim	aa	77.13552978674150	
	ii		80.71231066592770
	i	75.66758642135130	
6_063_piisimiuhkaan	ii		77.5315962077757
	i	76.37857504716680	
	aa	75.02570085603350	
6_075_nichishaan	i		76.85930166885740
	aa	75.61281957676230	
6_078_mitutisaan	i	70.59412234062420	
	u		80.36204510328460
	aa	76.18443174239220	
6_089_nuuhkum	uu		78.85984509100970
	u	76.94403901808690	
6_092_nitiwaashishiim	i		78.15160676001220
	aa	77.81510310925270	

	ii	76.99113875526500	
6_095_nitaaniskutaapaam	u	72.53304656144460	
	aa		77.55313222142190
	aa	74.94960880390060	
6_126_nisisim	i		80.499460092012
	i	76.51220561259270	
6_127_piihtuwupichiwiyaanaa	i	75.59103109358800	
	i		79.9224458254292
	aa	73.35911441285990	
6_162_nitaanishkiwishiim	aa	78.57081600760340	
	i		79.36914686864420
	ii	75.39064250823750	
6_173_uskutim	u	78.4887580084566	
	u		80.66426125443650
	i	77.69187158810280	
6_188_chiimaan	ii		78.82778452781710
	aa	73.70764521940870	
6_195_nimushum	i		77.9491496168968
	u	75.01687260530810	
6_210_aatiyuuhkaan	i		80.36942448754970
	uu	75.39786491835130	
	aa	73.39556805607630	
Average		75.9662226008005	78.801161491871

MN average intensity on final and non-final vowels in words with final plosives / + h/

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_005_mitukihp-h	i	69.24390022687210	
	i	76.6440647872956	
	i		77.73454078242770
5_006_niimaawiniwit-h	ii		79.49195576557570
	aa	79.16783846539120	
	i	76.78772421541980	
5_007_misinihiikinaachiniwit-h	aa		79.47979099223380
	i	71.18431045662880	
	i	77.66731223169580	
5_029_maschisk-h	a		78.56232401865950
	i	77.02551734505620	
5_036_chaachishaapaaya	i	74.09566099371000	

aukuhp-h	aa		77.62785171566550
	aa	75.3270353934631	
5_039_uschikimikw-h	u	73.68174015087680	
	i	72.47068123300930	
	i		78.76243707717730
5_050_shuwiyaaniwit-h	u	79.06978983740820	
	aa	78.48407761086660	
	i		79.23724290887580
5_056_chiskutimaatuukim ikw-h	aa	76.97791013022020	
	uu	78.76398923320100	
	i		80.5218385750317
5_060_astaasuukimikw-h	aa	76.22956689986760	
	uu	75.61144574944440	
	i		80.53225246384090
5_061_wiikhwaayaaukhp- h	ii		80.2065796674548
	u	76.99137283032130	
	aa	74.3440417962227	
5_066_chimuwinikuhp-h	i	77.1974254694103	
	u		78.83566891879960
	i	75.63596036358430	
5_068_piishaakinikuhp-h	aa	75.2794966320584	
	i		75.3335328679162
	i	72.15129668140580	
5_074_shuwuyaanimikw -h	aa	77.48925491154000	
	i	73.72237770317070	
	i		77.99581205680150
5_079_akhup-h	a		75.07114167595420
5_085_uschisk-h	u		77.9176370768986
5_086_uut-h	uu		76.01185645824190
5_100_wiikhwaayaaukuhp -h	ii		76.67206155556260
	u	74.78573830308560	
	aa	74.21679060956710	
5_113_chiipiimishtikuwit- h	i	71.68997246911100	
	u		75.1743900663771
5_119_panikik-h	a		75.96625267152750
	i	72.84200608095010	
5_131_mishtikw-h	i		78.22102745350170
5_132_chiipiikimikw-h	i	77.79851272150080	
	ii	80.02044722614500	
	i		83.0785313572821

5_149_uut-h	uu		75.87508186465670
5_155_uwaatinikuhp-h	u	74.62584033754850	
	aa		76.86715430877320
	i	75.13237115619810	
5_156_miiwit-h	ii		77.05995219003400
	u	75.89867547992280	
5_157_chishaayaakwaapit-h	aa	72.06090270962070	
	aa		75.57570683264670
	i	74.7661819394232	
5_170_miichisuukimikw-h	ii	74.55313621450950	
	uu	78.48236231467670	
	i		78.84913325837580
5_171_nipaaukinikw-h	aa	78.45962875063080	
	u	72.77399771049020	
	i		79.59724689602570
5_184_miinaahtikw-h	ii		77.75229163513980
	aa	75.29545258762660	
	i	73.6181192019221	
5_191_iiyimiichiiwaahp-h	ii	78.21244255528330	
	ii		79.29239799212840
	aa	75.45508120759840	
5_200_nisk-h	i		73.6064251266564
5_206_iyik-h	i		75.37590648196100
	i	70.7841097791476	
5_48_waat-h	aa		76.61733703648960
6_005_mitukihp-h	i	76.2698204403708	
	u	73.43813070246620	
	i		77.31873768703250
6_006_niimaawiniwit-h	ii		80.53470283036510
	aa	78.46965828418240	
	i	76.77454114287380	
6_007_misinihiikinaachiniwit-h	i	77.58598644971730	
	aa		79.04180313637070
	i	76.90707312138470	
6_029_maschisk-h	a	76.02974689984980	
	i		76.07250172148030
6_036_chachishaapaayaa ukuhp-h	i	76.34482119521740	
	aa		76.9210159402585
	aa	75.77532124421060	
6_039_uschikimikw-h	u	74.45237104060270	

	i	70.43797540997370	
	i		80.31383323813520
6_048_waat-h	aa		74.61234343679920
6_050_shuwiyaaniwit-h	i	78.72740847836060	
	aa	77.55239787815230	
	i		78.73552561868880
6_056_chiskutimaatuukim	aa	78.33973651296230	
ikw-h	uu	77.07405541141710	
	i		79.75306542342850
6_060_astaasuukimikw-h	aa	77.63202204570210	
	uu	71.24932501486490	
	i		80.72316783531690
6_066_chimuwinikuhp-h	i	75.17893978824710	
	u		79.1303386705636
	i	71.24938310407850	
6_068_piishaakinikuhp-h	aa	75.05900755012990	
	i		77.07420422347940
	i	73.0288720326675	
6_074_shuwuyaanimikw	aa	78.98960389312900	
-h	i	75.63180677331570	
	i		80.05827581278240
6_079_akhup-h	a		71.96126795380240
6_085_uschisk-h	u		75.59460658277300
6_086_uut-h	uu		75.28251726595800
6_100_wiikhwaayaaukuhp	aa		77.82283275263260
-h	aa	76.54221502906060	
	aa	72.8230040687836	
6_113_chiipiimishtikuwit-	i	76.25700578298180	
h	i	72.61237941646390	
	u		76.60282275483370
6_119_panikik-h	a		74.66377850677360
	i	74.06455950674520	
6_131_mishtikw-h	i		78.32446017708620
	i	77.09995595379130	
6_132_chiipiikimikw-h	ii	77.89151749575710	
	i		83.7751667765657
6_149_uut-h	uu		76.75419547020280
6_155_uwaatinikuhp-h	u	74.25220428162900	
	aa		74.85305718287690
	i	72.69848986360460	

6_156_miiwit-h	ii		78.40401510512130
	i	72.0378974601454	
6_157_chishaayaakwaapit-h	aa	71.63771679639900	
	aa	75.11990462543570	
	i		75.3640867268412
6_170_miichisuukimikw-h	ii	75.276640858785	
	uu	78.99568346627150	
	i		80.16056056009180
6_171_nipaaukinikw-h	aa	78.25597639642740	
	u	72.32845720434700	
	i		79.69164428114050
6_184_miinaahtikw-h	ii		77.7034914409953
	aa	74.72292975867130	
	i	74.70257130707070	
6_191_iiyimiichiiwaahp-h	ii	77.73179529720420	
	ii		79.51205432900730
	aa	75.48782126742820	
6_200_nisk-h	i		74.6381442379405
6_206_iyik-h	i	74.52417230652910	
	i		75.13490148219950
Average		75.3929939692192	77.7053409350831

MN average intensity on final and non-final vowels in words with plosives

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_004_uut	uu		76.71070298488780
5_021_uwaatinikuhp	u	74.44898487851070	
	aa	73.35073507252510	
	u		76.24579102848410
5_023_mitukihp	i	70.01918691749680	
	u		76.99342302007100
	i	75.07962804070700	
5_024_miiwit	ii		81.30871114772090
	i	74.75184329245920	
5_026_chaashishaapaayaakuhp	i	71.16031791443020	
	aa		77.9253104472026
	aa	72.97410721663700	
5_034_uschikimikw	u	75.00640489637300	
	i		77.52926268581060

5_043_waat	aa		74.88919101588280
5_045_iitaamiskimikw	ii	74.86552140475630	
	aa	78.29240773586590	
	i		78.56187442293950
5_049_chiipiikimikw	ii	77.31701330019630	
	ii	76.11333436960760	
	i		78.75625472648550
5_052_akuhp	a		75.11641587840470
5_053_misinihiikinaachini wit	i	78.02507244677260	
	aa		78.88347882630940
	i	78.06290087971960	
5_062_iiyimiichiwaahp	ii	73.93718802476980	
	ii		77.01295448529420
	aa	73.32578837426120	
5_069_miinaahtikw	ii		80.91849704547160
	aa	79.6762133524146	
	i	72.86837228343400	
5_071_piishaakinikuhp	aa	73.45692615229770	
	i		74.84755529309400
	i	74.01982254162160	
5_094_shuwiyaaniwit	u		79.50521692404280
	aa	77.36364877723850	
	i	77.28354885612740	
5_104_chishaayaakwaapit	aa	72.9033462013442	
	aa		77.2893262686487
	i	76.30392284956640	
5_123_nipaaukimikw	i	72.24547531792000	
	aa	77.54377944994460	
	i		78.51765479780510
5_129_nimihtinikaat	i	80.2084708062487	
	u		80.43820602927580
	aa	75.04427078007640	
5_145_miichisuukimikw	ii	76.13977885052000	
	uu	75.89702406597000	
	i		80.49138831568180
5_166_mishtikw	i		78.45387404147450
	i	77.095616885643	
5_169_niimaawiniwitt	ii		79.68774633879890
	aa	79.075176371709	
	i	75.86619701340390	

5_172_chimuwinikuhp	i	78.75874019077910	
	u		80.40826619375230
	i	78.30760414449660	
5_178_astaasuukinikw	aa	77.51608058443200	
	uu	66.99601512100550	
	i		79.27697966710600
5_185_shuwiyaanikinikw	aa	73.68188368002670	
	i	74.74105816788980	
	i		76.3601185445086
5_193_chiipiimishtikuwit	i	75.70470830042860	
	i	75.63736905627360	
	u		76.86048122585840
5_196_chiskutimaatuukini kw	aa	75.70613745573230	
	uu	75.54818443621020	
	i		77.11631442645930
5_208_mishtikuwit	i	69.82681540188790	
	u		76.01810109502710
6_004_uut	uu		77.56799328071180
6_021_uwaainikuhp	i		77.74222648179980
	aa	74.76953037408420	
	i	76.05457520545870	
6_023_mitukihp	i	72.89104242014050	
	u		74.75058287390760
	i	74.67512711437330	
6_024_miiwit	ii		81.3401504849513
	i	75.22910266647860	
6_026_chaashishaapaaya akuhp	i	75.00662705412340	
	aa		76.6392367128972
	aa	72.5972444843338	
6_034_uschikimikw	u	74.88567998946060	
	i		80.75105387092360
6_043_waat	aa	74.51285215443580	
6_045_iitaamiskimikw	ii	74.74414895857900	
	aa	78.4207744662785	
	i		78.76283521821630
6_049_chiipiikimikw	ii	76.05309060050140	
	ii	78.101854026225	
	i		79.79268493393400
6_052_akuhp	a		74.48512353713680
6_053_misinihiikinaachini	aa	78.04559047411940	

wit	i	73.52365931831740	
	i		78.28280577939370
6_061_wiikhwaayaaukuhp	ii	74.52008591010880	
	aa		76.08000669685160
	a	74.54483879483580	
6_062_iiyimiichiwaahp	ii	78.23729931202060	
	ii		79.33163831134290
	aa	72.03411391072650	
6_065_uut	uu		75.20524951527450
6_069_miinaahtikw	ii		79.87607341445650
	aa	75.34581408551380	
	i	73.85647801484450	
6_071_piishaakinikuhp	aa	74.12817471182800	
	i		75.90339636072370
	i	73.30298509236080	
6_094_shuwiyaaniwit	u		78.31997592558810
	aa	77.96419307083540	
	i	76.87674346540270	
6_104_chishaayaakwaapit	aa	73.84387158863560	
	aa		76.83717122651710
	i	74.41872733542030	
6_123_nipaaukimikw	a	76.81553927501420	
	u	68.44426059893110	
	i		78.44808549180530
6_129_nimihtinikaat	i	79.01192097057780	
	u		80.19508890498770
	aa	76.05399335353390	
6_145_miichisuukimikw	ii	76.58955917417950	
	uu	77.39258311457930	
	i		79.62260877731490
6_166_mishtikw	i		78.21834218463100
	i	77.34501583990060	
6_169_niimaawiniwit	ii	77.06035465414040	
	aa	76.79445349964520	
	i		77.81044333970230
6_172_chimuwinikuhp	i	73.86730364135590	
	u		78.0728920936549
	i	67.72506278317100	
6_178_astaasuukinikw	aa	76.119082614072	
	uu	70.07690027826660	

	i		78.3140625415243
6_185_shuwiyaanikinikw	aa	74.06399217676520	
	i	72.67884404348550	
	i		77.35004843874890
6_193_chiipiimishtikuwit	i		77.72030537253610
	i	73.78873817437370	
	u	77.01409571320030	
6_196_chiskutimaatuukini kw	aa	74.94239888382520	
	uu	73.63423510307450	
	i		77.24098848603600
6_208_mishtikuwit	i	66.66634164221070	
	u		73.65159586742020
Average		75.0199507911371	77.8988320545361

MN average intensity on final and non-final vowels in words with final vowels / + h/

Filename	Segment label	Avg. int. accented	Avg. int. accented
5_015_kaanichii-h	aa		78.96452343182000
	ii	75.38267970755270	
5_025_uskaataayaapii-h	aa	76.57704594304300	
	aa	76.49663757563330	
	ii		76.72815333843620
5_032_mihtiwikii-h	i		79.07337981973350
	i	76.86887808132790	
	ii	74.11102762104800	
5_042_maaskiniu-h	aa		78.03275532516810
	i	77.7606445248983	
	u	75.0473241700526	
5_044_kishkichaau-h	i	73.00815119103200	
	aa		77.61995489587830
5_081_iischiimaauschii-h	i		79.3055957986753
	aa	78.64244651017030	
	ii	76.55599820362050	
5_083_mishkushiu-h	i		79.71085621890490
	u	76.39688047026840	
5_097_miinaapuu-h	ii	78.8287769467451	
	aa	77.08292102666870	
	uu		79.13333657179460
5_101_mitihchii-h	i	72.55781569980930	

	ii		76.80770010782340
5_102_shikutaau-h	i	68.59864430321260	
	i		78.51844423553590
	aa	77.6863769962291	
5_124_wiichiyyiyiu-h	ii	74.07177830264040	
	ii		79.71166831629390
	i	75.27971538961070	
5_138_siipii-h	ii		78.83822837892610
	ii	76.65253760516460	
5_140_aschii-h	i	75.69242109663740	
	ii		77.94521918346880
5_158_waau-h	aa		76.01570887723620
	i	70.91766874742510	
5_163_muushtaau-h	uu		77.07664530547310
	aa	76.62693250259880	
5_174_nichishkaatuu-h	aa		79.15310710504360
	uu	78.91083581597810	
5_177_uniwii-h	u	73.25336093846760	
	ii		74.6057464878542
5_179_pipaayihtaamuu-h	aa		76.65191490703840
	aa	75.58538858390000	
	uu	76.0335131292912	
5_183_uskaataayaapii-h	aa		78.83280748726070
	aa	77.48265520152380	
	ii	76.41620586902830	
5_201_utimiskumaau-h	u	76.95564666092800	
	aa		77.18176789460590
	u	71.85219465513410	
6_015_kaanichii-h	aa		79.00016978884840
	ii	76.40538913098890	
6_025_uskaataayaapii-h	aa		76.87983263948140
	aa	74.92462622924160	
	ii	75.21114285022670	
6_032_mihtiwikii-h	i		78.21749838044540
	i	76.39180077078610	
	ii	77.22664760455150	
6_042_maaskiniu-h	aa	77.53799568669060	
	i		78.96000480018050
	u	74.3223857935683	
6_044_kishkichaau-h	i	66.46700188590010	

	aa		79.86018115091610
	u	73.34104425011720	
6_081_iischiimaauschii-h	i		80.56283756855270
	aa	78.32990518382190	
	ii	75.30995695350230	
6_083_mishkushiu-h	i		79.05079960287980
	u	75.6313390760123	
6_097_miinaapuu-h	ii		78.28833278847570
	aa	77.35377071919230	
	uu	77.15496493864900	
6_101_mitihchii-h	i		78.73030493597940
	ii	75.00602785996070	
6_102_shikutaau-h	i		79.63288557756590
	aa	77.5704765917053	
	u	70.89933128958300	
6_124_wiichiyyiyiu-h	ii	74.01914770526770	
	ii		79.18819035630860
	u	74.92584589209900	
6_138_siipii-h	ii		80.59819655296470
	ii	77.2401507181808	
6_140_aschii-h	a	75.29118407609330	
	ii		76.93151906784170
6_158_waau-h	aa		77.1812268485864
	u	72.91886074788090	
6_163_muushtaau-h	aa		78.31477821190730
	u	76.5883352977514	
	u	73.74046057787820	
6_174_nichishkaatuu-h	aa	74.26305612971400	
	uu		75.73919921490350
6_177_uniwii-h	u		76.57320433365600
	ii	76.01829798352220	
6_179_pipaayihtaamuu-h	aa	76.04664223019530	
	aa		76.56601703359330
	uu	75.16991064191670	
6_183_uskaataayaapii-h	aa		78.45988457949580
	aa	76.765943705835	
	ii	74.92906664280920	
6_201_utimiskumaau-h	u	73.15118549275970	
	aa		77.5586334758506
	u	72.5728055913908	

Average		75.3235129631844	78.1550302648851
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MN average intensity on final and non-final vowels in words with final vowels

Filename	Segment label	Avg. int. non-accented	Avg. int. accented
5_013_miinaapuu	ii		80.5048899752723
	aa	77.89423540399660	
	u	70.41081578358300	
5_014_muushtau	uu		80.26488329128980
	aa	67.31786051448100	
5_041_waau	aa		76.59113165564260
	u	69.56059104038840	
5_046_mitihchii	i		76.65252786654710
	ii	68.96020821472210	
5_047_maaskiniu	aa	79.66833423822870	
	i		79.74726319156820
	u	73.35270228035780	
5_070_uniwii	u		78.12245417120180
	ii	72.44357554627910	
5_072_iischiimaauschii	i		79.30245795547620
	aa	77.59080169348990	
	ii	68.0361303042328	
5_141_niwiichiyyiyiu	i		79.663567311697
	ii	78.68205769529700	
	i	75.38185219623860	
5_148_mihtiwikii	i	79.04984144346610	
	i		80.6359090208661
	ii	72.43347070375510	
5_164_wichii	i		76.81787378827770
	ii	72.57033921995450	
5_167_uskaataayaapii	aa		77.73072205930170
	aa	76.40992105001020	
	ii	69.98579979187520	
5_180_siipii	ii		80.41913256865870
	ii	72.83298450372170	
5_187_shikutaau	i	66.52813997730410	
	u		78.31501969925390
	aa	73.54599844037210	

5_189_miyiu	i		81.17052317142450
	u	73.0736512709261	
5_192_aschii	a		77.1786962373218
	ii	72.62334021182910	
5_194_kaanichii	aa		76.98721978315840
	ii	74.74330550850880	
5_198_mishkushiu	i		77.08337555404650
	u	66.55433240306140	
5_214_uskaataayaapii	aa		77.10859528520590
	aa	75.77633392118530	
	ii	72.36338640832010	
6_013_miinaapuu	ii		80.75671493573390
	aa	78.91643457661510	
	ii	68.1835054626472	
6_014_muushtau	uu		80.60500313403200
	aa	70.56602788693960	
6_041_waau	aa		77.22187378217770
	u	70.295801799877	
6_046_mitihchii	i		77.478119460887
	ii	69.71137733957850	
6_047_maaskiniu	aa	78.57118043544040	
	i		79.29040179679010
	u	75.84299428822770	
6_070_uniwii	u		78.27625380047210
	ii	67.87999272592520	
6_072_iischiimaauschii	i		81.00320082466080
	aa	77.76359670207580	
	ii	66.62904859089370	
6_141_niwiichiyyiyiu	ii	79.17477638281220	
	ii		79.6974952412216
	u	67.942290355898	
6_148_mihtiwikii	i	77.04325488176040	
	i		79.60667874284590
	ii	68.81541234430420	
6_164_wichii	i		78.94864716590650
	ii	74.33651807211030	
6_167_uskaataayaapii	aa		79.05232822695840
	aa	77.77895128389560	
	ii	66.61621841426940	
6_180_siipii	ii		79.96258183924740

	ii	73.81851567827760	
6_187_shikutaau	i	75.40685101743790	
	u		80.17587050153920
	aa	67.67876461682830	
6_189_miyiu	i		79.49126051244730
	i	67.40650588350440	
6_192_aschii	a		75.6446549412356
	ii	68.763963204496	
6_194_kaanichii	aa		75.11647423128090
	ii	70.93392125365360	
6_198_mishkushiu	i		79.69982929727360
	u	64.68372545216900	
6_214_uskaataayaapii	aa		76.57925340195450
	aa	76.21004461502840	
	ii	67.73532935867720	
Average		72.4325963920948	78.6917467895243